



REVIEW



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A systematic review of empirical studies on gamified learning environments for women in the last decade (2015–2025)

OMIKA BHALLA SALUJA^{1✉}, Deepti Sharma¹, Man Mohan Shukla¹ & Harit Kumar¹

This is a systematic review of 38 empirical studies on gamified learning environments for women from 2015 to 2025, filling a key gap in gender-responsive design and methodology. The primary aim of this study is to develop an integrated theoretical framework of gendered experiences during gamified learning, to identify the effective gamification strategies for female learners, and to discuss the possibility of gamification to challenge traditional gender roles. The study is structured according to PRISMA 2020 guidelines, using thematic synthesis and quality appraisal through the Mixed Method Appraisal Tool (MMAT, 2018). 31.6% ($n = 12$) studies met all appraisal criteria (5/5), while 65.8% ($n = 25$) met four out of five criteria, indicating the robustness of our study selection. This review contributes an empirically grounded multidisciplinary framework incorporating five key constructs – gamification, the self-determination theory, social-collaborative, feminist-gender, and cognitive load approaches – recognising seven core variables – autonomy, competence, relatedness, motivation, engagement, social identity, and instructional design. Thematic analysis shows that gamification elements (points systems, badges, levels, and collaborative challenges) strongly boost motivation, engagement, and self-efficacy of the female learners. Nineteen studies have positive results, and eleven reported mixed results. This study offers practical recommendations to educators and designers to design inclusive and empowering gamified learning environments that can reduce gender differences and encourage transformative learning experiences. The findings highlight the need to have context-sensitive, collaborative and mastery-based design and institutional support on fair access and teacher training.

Introduction

Gamification leverages game based elements like points and badges to enhance engagement in education and business (Deterding et al. 2011; Hamari et al. 2014). Its efficacy is increasingly relevant due to the widespread connectivity of digital gaming and the closing of traditional demographic divides in gaming participation (Entertainment Software Association 2013; Mcgonigal 2011).

¹Pranveer Singh Institute of Technology, Kanpur, India. ✉email: omika.bhalla@psit.ac.in

Despite its rapid proliferation, gamification lacks consistent definitions and theories (Deterding et al. 2011; Seaborn and Fels 2015). In their seminal multidisciplinary review, Seaborn and Fels (2015) highlighted conceptual underdevelopment and lack of empirical evidence, particularly regarding its application in Human Computer Interaction (HCI) and education.

Positive engagement and achievement are usually reported in empirical studies (Borges et al. 2014; Sailer and Homner 2020), but these effects depend on the demographics, cognition, and motivation (Koivisto and Hamari 2019; Klock et al. 2020). Seaborn & Fels (2015) found most gamification studies ignored participant gender, calling for diverse learner research—a gap that persists.

Gender is still the least studied in gamification. Women make up 50% of gamers and prefer informal and social games (Entertainment Software Association 2013); still, educational gamification does not take into account the effects of stereotype threat, under-representation, and self-efficacy gaps (Steele 1997). The majority of the studies refer to general populations and how the gamified interventions replicate or reduce gender inequities (Hamari et al. 2014; Seaborn and Fels, 2015).

Gender differences emerge as males prefer competitive gamification, while females prefer collaborative/mastery features (Piquer-Martinez et al. 2024; Almusharraf 2023). Recent reviews highlight immersive technologies (metaverse, VR, AI) and gender-sensitive design needs (Buragohain et al. 2025a, 2025b, 2025c).

Gender-sensitive interventions succeed in financial inclusion/entrepreneurship (Saluja 2024; Saluja et al. 2023), suggesting gamification's potential as an inclusive tool addressing women's equity challenges.

This PRISMA-guided review fills Seaborn & Fels' (2015) gap, synthesising 38 empirical studies (2015-2025) on women in gamified learning with three goals: (1) develop an empirically grounded theoretical framework of gendered experiences, (2) identify effective gamification strategies for female learners' motivation/engagement, and (3) explore gamification's potential to challenge gender roles and empower women.

In this respect, we discuss the following research questions:

RQ1. What are the key theoretical underpinnings of an effective gamified learning environment for women?

RQ2. How can gamification enhance motivation, engagement, and achievement in female learners?

RQ3. What are the most effective gamification elements and designs for achieving equitable learning among women?

RQ4. What role can gamification play in breaking the stereotypes and traditional gender roles in educational settings?

This synthesis demystifies gamification-gender knowledge, evaluates gender-sensitive design evidence, and outlines future research/practice opportunities.

Review Of Previous Reviews

Recent reviews/meta-analyses examine gamification's impact, issues, and methods in education/interactive systems (Table 1).

Gamification research progressed from conceptual arguments (Seaborn & Fels, 2015) to motivation (Hamari et al. 2014), effectiveness (Sailer and Homner 2020), and personalisation needs (Klock et al. 2020) (Table 1). Reviews noted ethical issues (Hyrynsalmi et al. 2017) and methodological gaps (Dichev and Dicheva 2017).

Literature consistently overlooks equity/diversity, especially gender-specific gamification design and outcomes. While user characteristics like gender are mentioned, few reviews examine how gamified environments address women's unique needs, motivation, and barriers.

This review addresses the gap by examining women in gamified learning via thematic synthesis, identifying gender-specific issues/design opportunities. Unlike prior reviews focusing on single gamification/gender facets, we synthesise empirical evidence on both.

Our research innovates by integrating multidisciplinary theories into a comprehensive gender-sensitive framework for women's gamified learning, advancing beyond prior summaries with empirically grounded design themes and practical implications.

Integrated Theoretic Framework

Rationale for integration. Research into gendered educational experiences spans pedagogical, psychological, and socio-cultural perspectives, often drawing on theories of social identity, motivation, and instructional design (Deci and Ryan 2000; Tajfel and Turner 2001). While these variables are frequently discussed in isolation, there is a significant lack of research regarding their combined effects.

In order to close this gap, this paper synthesises perspectives from motivation, gamification, feminist theory, social learning, and cognitive science. This synthesis reveals intersecting constructs such as autonomy, competence, relatedness, motivation, engagement, instructional design, and social identity, which are essential to educational achievement and gendered experience (Deci and Ryan 2000; Vygotsky 1978; Crenshaw 1989). By establishing interdependence between these frameworks, this study provides a holistic foundation to inform subsequent research questions and analysis (Grant and Booth 2009).

Our framework (Fig. 1) integrates gamification, self-determination, social/collaborative, feminist/gender, and cognitive load theories—core recurring variables at the centre, and unique constructs at the periphery. This synthesises disconnected perspectives, emphasises feminist/cognitive concerns, and provides a hierarchical visual framework surpassing typology models for gender-responsive gamified learning design.

Stepwise construction of framework. Framework construction systematically extracted and coded study variables into five clusters: gamification, self-determination & motivation, social & collaboration, feminist & gender, and cognitive load. Core shared variables were inductively identified alongside unique theory-specific ones (Table S1 outlines five replicable steps).

Core and unique variables identified via coding and thematic synthesis informed framework configuration and visualisation.

Relations: Theoretical Between and Within Clusters

Core variables as integrative mechanisms. Our combined model identifies seven fundamental variables that link multiple theoretical approaches to gamified learning for women: autonomy, competence, relatedness, motivation, engagement, social identity, and instructional design. These variables recur across all 38 studies and emerge as critical to successful and equitable gamified learning. Table S2 (Supplementary) summarises their roles within each theoretical tradition, providing theoretical consistency and practical guidance for designing inclusive, gender-sensitive gamified learning environments.

Gamification Constructs. Gamification elements (points, badges, leaderboards, rewards, challenges, levels, and narratives) scaffold motivation via autonomy, competence, and relatedness (Seaborn and Fels 2015; C1, C5, C7, C12). Engagement (behavioural/cognitive/emotional) mediates academic gains across contexts (C3, C9, C14, C18, C22). Adaptive designs accommodate HEXAD/user differences; gender-sensitive approaches reduce stereotype

Table 1 Review of previous review studies on gamification and women’s learning.

Study	Focus	Key findings	Identified Gaps
Seaborn & Fels (2015)	Systematic review across HCI/ education domains	Inconsistent definitions and underdeveloped theory, empirical validation limited	Lack of consensus; methodology and theory gaps, limited design guidance
Hamari et al. (2014)	Review (Motivational affordances)	Effectiveness depends on context and user characteristics.	Context dependence limits generalization
Hyrnsalmi et al. (2017)	Review (“Dark side” of gamification)	Raised concerns about game addiction, ethical /moral issues.	Need for guidelines and more research
Dichev & Dicheva (2017)	Critical review	Stressed need for robust research methods, enthusiasm may outpace evidence.	Need for more empirical studies
Sailer & Homner (2020)	Meta-analysis	Small but significant positive effects on cognition, motivation, behavior, game fiction /social interaction matters.	Need more on effective design elements
Klock et al. (2020)	Review (t = Tailored gamification)	Customization based on user profiles (preferences, gender, personality); need for advanced user modeling.	Limited research on trait interplay

(Author’s own work).

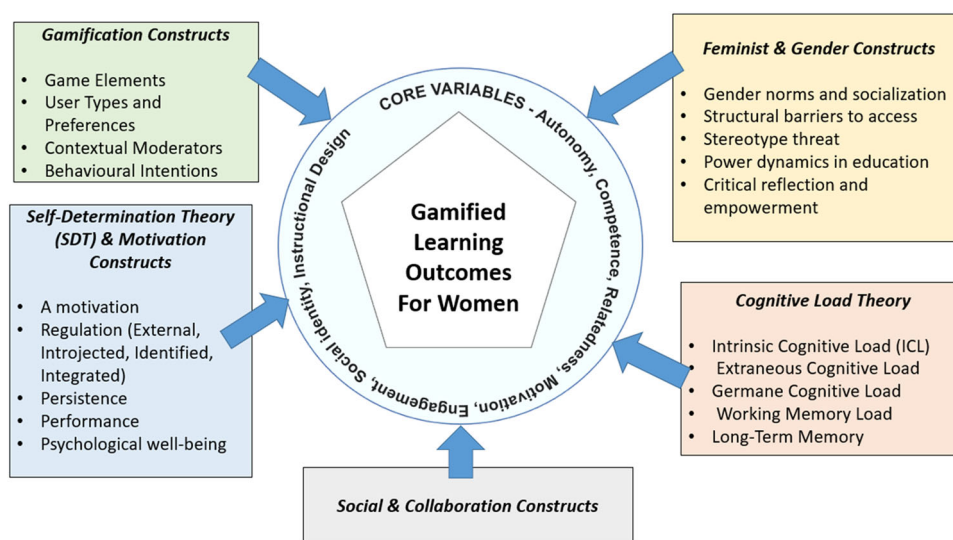


Fig. 1 Integrated theoretical framework for gamified learning for women.

threat (C2, C4, C6, C11, C16, C21, C24, C27). Sustained adoption depends on behavioural intentions, attitudes, usefulness, and self-efficacy (C8, Cheung & Ng, 2021 (C20), Şenocak et al. 2021 (C28)).

Self-Determination Theory (SDT) and Constructs of Motivation. SDT uniquely addresses amotivation—the lack of intent preventing engagement—among female learners in gamified settings (C4, C15). It identifies four regulatory types influencing motivation: external (rewards/pressures), introjected (internal pressures), identified (personal importance), and integrated (assimilated motivation) (C7, C19). These fulfil self-determination/mastery needs, ensuring persistence (C12, C23) and improved performance with higher identified/integrated regulation (C14, C25). Gamification supports well-being, reduces anxiety, and mediates motivation-learning success (C10, C22, C28).

Constructs of Social and Collaboration. Collaborative variables (group composition, communication, peer feedback) drive motivation and engagement (C8, C17, C31). Social regulation

(negotiation, scaffolding) enhances learning via group autonomy and support (C10, C21). Social Identity Theory shows categorisation and identification yield gains (in-group favour) but biases (Tajfel and Turner 2001; C18, C29); women’s groups foster uniqueness and stereotype resistance (C24). Constructivist views emphasise experiential or social negotiation for conceptual change and autonomy (Vygotsky 1978; C12, C27). Thus, social and collaborative processes mediate gamified features and positive learning outcomes (C14, C25, C38).

Feminist and gender constructs. Feminist constructs illuminate social or structural barriers shaping women’s gamified experiences (Crenshaw 1989; Butler 1990; Hooks 1994): gender norms limit self-perceptions and technology engagement (C3, C6); structural obstacles (resources, digital literacy, representation) constrain leadership (C11, C37); and stereotype threat and power dynamics undermine performance/autonomy (C17, C23, C26, C28, C29). Feminist pedagogy counters via critical reflection, norm-challenging, agency-building, and transformative practices (C10, C12, C28, C37), fostering confidence and equity while dismantling barriers for empowerment and belongingness (C12, C22, C37).

Table 2 Key learning outcomes from gamified learning of women.**Key Learning Outcomes**

Increased motivation and engagement
 Improved academic performance
 Enhanced psychological well-being and reduced anxiety
 Strengthened self-efficacy and persistence
 More effective cognitive processing and retention
 Personalized and adaptive learning satisfaction
 Deeper understanding through collaboration and social learning
 Mitigation of structural and stereotype barriers

(Author's own work).

Cognitive Load Theory. Cognitive Load Theory (CLT) offers an understanding of mental effort in processing new knowledge, which indicates the main challenges and opportunities of women in gamified education. The three types of cognitive loads identified by CLT include intrinsic load, which is associated with the complexity of the content and its interactivity (C16; C19); extraneous load, which is a result of an inappropriate instructional design or distracting gamification features (C7; C21); and germane load, which is an effort directed at schema building and long-term retention and is encouraged by well-scaffolded activities (C18). Most importantly, learning is effective when the working memory does not become congested (Sweller et al. 2019). Overload, in practice or in the game itself, may decrease the engagement, especially in the case of learners who are sensitive to digital anxiety or stereotype threat (C23). Balanced gamification is the optimal type of gamification that leverages customised supports, accessible progress and peer scaffolding to optimise engagement and retention among women learners (C20; C27; C31).

All-inclusive, CLT enhances the framework, as it puts emphasis on the balanced mental work, powerful designing of instructions and alignment of cognitive and emotional learning to engage deep and long-term learning.

Learning outcomes in gamified learning for women. The integrated theoretical framework highlights some of the most notable educational outcomes (Table 2) that are shared in the literature of gamification in women students. These are the results that may be considered as central to the practical implications of the core and unique variables of the framework. Presenting these outcomes in a structured way assists in showing the relevance of the framework in enhancing educational experiences and equality. All these results prove the point that the core and unique variables and constructs identified in the framework drive the success of education and fair experiences of females in gamified learning conditions.

This framework guides gender-equitable gamified learning design and evaluation. Further, core variables and clusters inform future research and practice (detailed in limitations/implications).

Research Methodology

It is a systematic review that is performed according to PRISMA 2020 requirements to provide transparency and reproducibility (Page et al. 2021). This was done through five important stages: literature search, eligibility screening & inclusion (Fig. 2: PRISMA flow diagram), quality evaluation, theoretic integration and thematic synthesis.

Search strategy. February 11, 2025, was chosen as the date of the search in the Web of Science and Scopus databases using the search string: (TITLE-ABS-KEY (gamification)) AND ((learning OR education OR literacy)) AND (women OR female OR gender). These databases were selected because they have extensive coverage of peer-reviewed literature across the social sciences and other interdisciplinary areas, stringent inclusion criteria, and general acceptance in educational technology studies (Gusenbauer 2022; Powell et al. 2017). Scopus has extensive indexing, especially for emerging journals, and Web of Science contains high-impact journals with established citation networks. This integrative strategy balances quality and breadth in order to make relevant and high-quality studies. Incongruent coverage and differing indexing of other databases were avoided as they reduced the best systematic review practices (Martin-Martin et al. 2018).

Eligibility and screening. Only peer-reviewed articles written in English since 2015 were included in the study. To achieve comprehensive coverage, the search was supplemented with backward and forward citation tracking as well as expert advice.

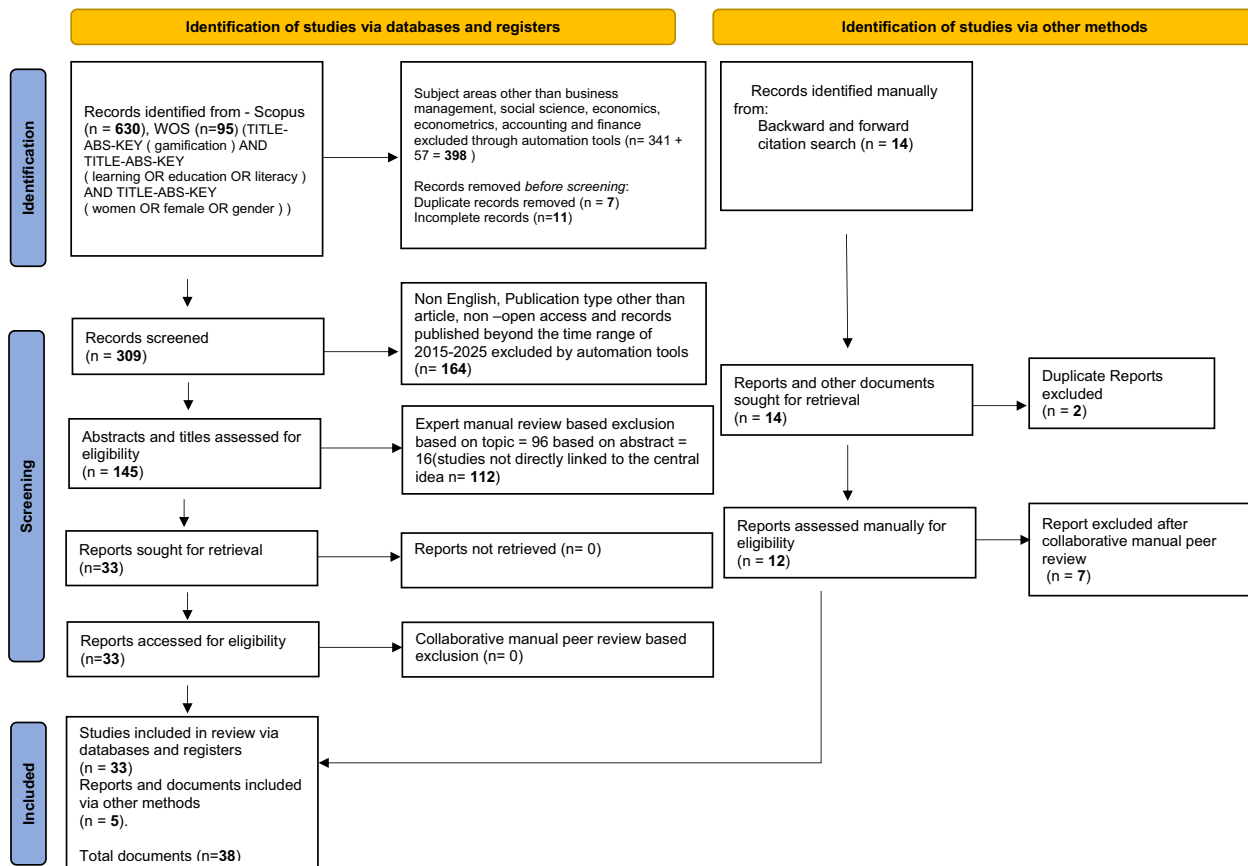
Specifically, the inclusion criteria included the following conditions: (1) peer-reviewed journal articles, (2) empirical research (qualitative, quantitative, or mixed methods), (3) concerned gamification in education, and (4) included one of the variables (women, female learners, or gender). Excluded were proceedings of conferences, books, unpublished manuscripts, reviews, articles, editorials, and those studies that were not dedicated to the subject of education or gender.

The screening process was done in two phases: title/abstract review and then a full-text evaluation. The reviewers were two independent people who rated 145 articles and agreed on the inconsistencies. Fourteen other references were found by tracking citations and expert suggestions. Having eliminated duplicates and non-relevant reports, 38 studies were incorporated into the eventual synthesis (Fig. 2).

Although the sample size of 38 studies may be considered small, it indicates the narrowness of the research topic, which is the intersection of gamification, gender/women, and learning environments. The scarcity of quality empirical research highlights the gap in research and the timeliness of this review. The strong relevance and reliability of our sample is supported by rigorous inclusion criteria and quality appraisal (MMAT 2018). Thus, while the sample is smaller than larger reviews of gamification, it represents the existing evidence that is necessary in advancing understanding and informing gender-sensitive gamification research and practice in education.

Quality appraisal. Mixed Methods Appraisal Tool (MMAT) version 2018 (Hong et al. 2018) is used to assess the quality of included studies. Each study was evaluated by two independent reviewers based on five design-specific criteria, whose responses were rated as "Yes", "No", or "Can't Tell". Conflicts were solved by dialogue. The studies were categorised according to the methodology used: qualitative, quantitative randomised, quantitative non-randomised, quantitative descriptive or mixed methods. The ones that fulfilled all the conditions (5/5) were considered to be of high quality.

Data extraction and thematic synthesis. A standardised form was employed to extract the data, including the study characteristics (author, year, type, keywords, etc.), the features of the participants (demographics and gender), and the elements of gamification, educational setting, and gender outcomes. Thematic analysis was conducted in four phases, namely, (1) familiarisation and initial coding by two independent reviewers; (2) iterative



Adapted: Page et al. (2021)

Fig. 2 PRISMA 2020 Flow Diagram: A Step-by-Step Overview of the Identification, Screening and Inclusion of Studies.

consensus to form themes; (3) synthesis and interpretation of confirmatory and conflicting evidence; and (4) clear description of the analytic procedure to achieve rigour and reproducibility. Inter-rater reliability was determined in the first round of coding by independent coding by two reviewers and then discussing and coming up with an agreement on the areas of discrepancies.

Thematic analysis justification. Thematic analysis was chosen as the major synthesis method because of a significant amount of heterogeneity between the studies included in terms of their research design, educational setting, and outcome measures. Thematic analysis is suitable as opposed to meta-analysis, which presupposes homogeneity as a method in synthesising varied qualitative and quantitative evidence (Thomas and Harden 2008; Braun and Clarke 2006). This approach is compatible with the exploratory goals of this review in the sense that it allows defining and drawing meaning out of general trends and subtle gender-specific impacts in a complex literature. In order to increase accuracy and reduce the subjectivity, data were coded by two reviewers with consensus reached through discussion, and the process was transparently documented.

Results

Findings on quality assessment. The MMAT appraisal (Table S3: MMAT Summary of 38 Screened Studies, Appendix) demonstrated that 12 out of 38 studies met all five quality criteria, and 25 out of them scored 4/5, mainly because of sampling or confounder limitations. Superior-quality studies reported finer

gender effects more often and employed strong experimental or mixed-method designs.

In the process of thematic synthesis, it was decided to give more interpretive weight and focus to the results of high-quality studies to strengthen the strength of thematic conclusions. The moderate-quality studies were to be included carefully, and no low-quality studies were to be kept in the final synthesis. This method, which is sensitive to the quality, made sure that the emergent themes and conclusions were mostly based on the methodologically sound evidence, thus increasing the reliability and validity of the findings of the review.

However, the gender differences were not examined in-depth in many studies even though gender-balanced samples were used. The results of Table 3 give an overview of the MMAT-based quality ratings of all the 38 studies.

Fifteen studies (39%) reported significant /mixed gender effects in gamified learnings. A few of them showed higher advantages to female learners, especially in motivation and engagement, whereas others found higher advantages to male learners, especially in performance and enjoyment. A number of high-quality studies (e.g., study codes C5, C22, C23, C36, and C38) offered strong evidence of the effect of gender moderation.

The 38 studies included in our sample are summarised comprehensively in Table S4: Summary of 38 Key Studies on Gamification and Women and quantitatively in Table 4. The quantitative summary is based on the type of study, outcomes for women, and the educational context. This table brings out the dispersion and the key features of the evidence base to provide a clear overview of the empirical findings.

*Note: Counts represent unique studies per subcategory; a few studies appear in multiple subcategories within each category due to multifaceted characteristics.

Many common gamification elements have shown a mixed effect on the motivation, engagement, and learning results of female learners. Table 5 summarises the most prominent game mechanics, their key advantages, and their gender-sensitive designing, based on the findings of our 38 sample studies.

Table 5 shows that the use of points, badges, levels, and challenges can be effective motivators to female learners by promoting autonomy, competencies, and relatedness, which are the three main elements of the integrated theoretical framework. It further highlights the subtle aspect of the use of leaderboards, which must be carefully designed not to reinforce negative stereotypes or demoralise women, especially in male-dominated or STEM educational settings.

The thematic analysis in the following section will determine the key patterns and knowledge about gamification and the experience of women learning.

Themes identified. We applied qualitative synthesis methodology in performing a thematic analysis to identify five major themes about gamification and learning experiences in women. Table 6 connects these themes and sub-themes to our research questions and offers an organised overview of the findings.

All themes and sub-themes were examined with emphasis on gender so that the results can represent the experience, challenges and opportunities of the female learners in the gamified environments.

Gender dynamics and perceptions of gamification. The theme explains how gender stereotypes and biases influence women’s experiences in gamified learning environments. Competitive

elements like leaderboards trigger stereotype threat, reducing female learners’ motivation and performance (Albuquerque et al. 2017; Christy and Fox 2014). Females prefer mastery- and collaboration-based mechanics—such as badges and narrative progression—that support intrinsic motivation, autonomy, and relatedness (Codish et al. 2017; Alsofyani 2022). Emotional challenges like anxiety highlight the need for gender-sensitive design (Pedro et al. 2015; Chen and Wang 2011), while feminist perspectives stress addressing power imbalances to empower women (Ismail et al. 2022; Senocak et al. 2021).

Female engagement motives of gamified learning. The elements of gamification that address core psychological needs central to Self-Determination Theory (autonomy, competence, and relatedness) induced engagement and motivation among female learners. Research, including Brull and Ruiters (2016), establishes the benefits of collaborative challenges and meaningful narrative assignments for enhancing social connectedness and motivation. The standpoints of the teachers also help to understand that gamification can be used to enhance the involvement of females in diverse settings (C18, C21, C6, C29). Technological integration is equally important in supporting engaging, personalised, gamified experiences (C7, C9, C10, C11, C16).

Contextual gender studies of gamification. Gamified learning has unique gender effects across different educational domains. There are special challenges and possibilities in health professions education, language learning, negotiation training, and teacher education. As an example, gamification in health education increases the level of practical skills and confidence of female learners (Albuquerque et al. 2017), and language studies discuss the effectiveness of culturally relevant information addressing the needs of female learners (Alsofyani 2022). This domain-specific analysis stresses the importance of a context-sensitive gamification design.

Designing gender-sensitive gamification. This is a theme that dwells upon the principles of design that directly address gender inequities. The inclusion of game-based strategies that might result in collaboration, empowerment, and emotional safety is essential (Ismail et al. 2022; Senocak et al. 2021). Culturally responsive content, adaptive challenges, and teacher training are some of the elements that contribute to the creation of inclusive and equitable gamified environments (Alsofyani 2022; Brull and

Table 3 Quality distribution of included studies.

Quality Rating	Count	Percentage
High (5/5)	12	31.57%
Moderate (4/5)	25	65.78%
Low (<= 3/5)	1	0.03%

(Author’s own work).

Table 4 Summary of empirical evidence by study type, outcome for women, and educational context. For study codes refer to Table S4.

Category	Subcategory	Number of Unique Studies*	Actual Study Codes (n = 38)
Study Type	Qualitative	12	C1, C3, C9, C15, C17, C24, C29, C30, C32, C36, C37, C38
	Quantitative	22	C2, C4, C5, C6, C7, C8, C10, C11, C12, C13, C14, C16, C18, C19, C21, C22, C23, C25, C26, C27, C28, C31
Outcome for Women	Mixed Methods	8	C1, C9, C14, C20, C29, C36, C37, C38
	Positive	19	C2, C5, C6, C7, C8, C10, C11, C12, C13, C14, C16, C17, C18, C19, C20, C22, C25, C26, C32
	Mixed	11	C1, C3, C4, C9, C15, C21, C23, C24, C27, C35, C38
Educational Context	Negative	6	C1, C24, C27, C28, C31, C37
	Not Classified	6	C15, C20, C29, C30, C33, C34
	STEM	10	C2, C3, C5, C6, C7, C11, C12, C22, C25, C36
	Language	8	C4, C9, C10, C14, C15, C21, C32, C38
	Health Professions	6	C8, C13, C19, C27, C30, C31
Other (Negotiation, Apps)	Teacher Education/Online	6	C16, C17, C18, C21, C28, C35
	Other (Negotiation, Apps)	8	C1, C20, C24, C26, C29, C33, C34, C37

(Author’s own work).

Table 5 Summary of gamification elements, their gender-sensitive benefits and outcomes.

Gamification Element	Key Benefits	Gender-Sensitive Design Insights	Gendered Learning Outcomes	Supporting References
Points Systems	Boost intrinsic motivation, persistence	Favor mastery and personal growth over competition	Increased motivation, engagement, and autonomy	Alsofyani (2022); Suharno et al. (2023)
Leaderboards	Motivate through competition, risk stereotype threat	Balance competitiveness and collaboration	Mixed effect on anxiety and performance	Brüll & Ruiter (2016); Albuquerque et al. (2017)
Badges/Achievements	Recognize progress, increase pride	Reduce social comparison, support confidence	Improved self-efficacy and identity	Codish et al. (2017); Zahedi et al. (2021)
Levels/Progression	Clear goals, foster autonomy and mastery	Builds confidence, reduces stereotype threat	Enhanced measurable learning gains	Tamrin et al. (2022); Vazquez-Calatay et al. (2024)
Challenges/Quests	Develop critical thinking	Inclusive design promotes agency, counters stereotypes	Higher engagement, motivation, social interaction	Pedro et al. (2015); Almusharraf et al. (2023)

(Author's own work).

Ruiter 2016). Reflective design minimises stereotype threat and develops agency, enhancing women students in terms of experience and performance.

Gendered learning outcomes. The empirical evidence demonstrates that motivating aspects of gamification, such as badges and levels, can be effectively utilised to promote the rates of intrinsic motivation and perceived competence among females (Brull and Ruiter 2016; Codish et al. 2017). Nevertheless, the level of objective learning differs among the studies, suggesting that the context, design, and implementation of the task play one of the most crucial roles in the study (Pedro et al. 2015; Chen and Wang 2011). These findings indicate the possibility and also the uncertainties of gender-responsive forms of gamification.

These thematic understandings are upheld through the assistance of a detailed coding and data extraction table (Table S4, Supplementary) that provides the foundation of the evaluation and synthesis of the qualitative analysis.

Thematic Discussion

The overall high quality of methodology of the reported studies strengthens confidence in the perceived effects of gamification on learning outcomes. However, the prevalence of quasi-experimental and descriptive designs, along with the frequent inability to control confounding variables, suggests that the findings should be viewed with some caution.

Figure 3 indicates five primary themes that have helped in synthesising the literature on the topic of gamification and the learning experience of women. These themes provide us with a conceptual framework for understanding the intricate relationship between gender and gamification factors and learning outcomes.

Gender Dynamics & Perceptions

Gender stereotypes and bias. Stereotypes and prejudices are still persistent issues in learning environments that use gamification, and the experiences and results of female learners are influenced in a complex manner. Competitive or comparison-driven systems such as leaderboards have also been identified to cause stereotype threat, which has been observed to increase stress and negatively affect performance among women (Albuquerque et al. 2017; Christy et al. 2014). In response to this, designers can create inclusive spaces, which proactively confront stereotypes and assert relatedness, autonomy, and competence in the context of self-determination theory (Alsofyani 2022; RQ2). Motivational techniques give more preference to mastery-orientated or collaborative mechanics than competition, taking into account gender-specific preferences like a higher desire among women to receive badges and storylines than among men to compete and see progress bars (Codish et al. 2017).

Gender sex differences in gamification experiences. Significant gender differences emerge in gamification preferences. Female college students favour autonomy, mastery and relatedness features (challenges, guilds, personalisation and voting), while males prefer action and multiplayer modules (Alsofyani 2022; Brull and Ruiter 2016). Females experience more negative emotions (Pedro et al. 2015), yet show higher motivation and performance in some cases (Chen and Wang 2011; Legaki et al. 2020; Rodrigues et al. 2024). This demands culturally sensitive designs accommodating within as well as between-gender diversity (RQ2, RQ3).

Feminist Perspectives. Feminist scholarship focuses on the need to manage power relationships, equity and emotional welfare in gamified learning designs in order to eliminate stereotypes and

Table 6 Five key themes identified in designing gamified learning environments for women.

Theme	Sub-theme	Frequency	Study Codes* (n = 38)	Relevance to Research Questions
Gender Dynamics & Perceptions in Gamification	Gender Stereotypes and Bias	7	C1, C17, C23, C34, C36, C37, C38	RQ2; RQ3; RQ4
	Gender Differences in Gamification Experiences	8	C17, C22, C24, C26, C34, C35, C37, C38	RQ2; RQ3
Female Engagement Drivers in Gamified Learning	Feminist Perspectives	7	C22, C28, C29, C30, C33, C34, C36	RQ2; RQ4
	Engagement and Motivation	11	C2, C4, C5, C14, C19, C20, C25, C32, C33, C36, C37	RQ2
Contextual Gender Studies of Gamification	Teacher's Perspectives	4	C6, C18, C21, C29	RQ2; RQ3
	Technology Integration	5	C7, C9, C10, C11, C16	RQ3
	Health Professions Education	3	C8, C26, C29	RQ2
	Language Learning Negotiation	4	C4, C14, C15, C28	RQ2; RQ3
Designing Gender-Sensitive Gamification	Teacher Education and Online Learning	1	C33	RQ2; RQ3
	Game Mechanics	3	C2, C6, C14	RQ3
	Educational Apps	5	C17, C24, C34, C35, C37	RQ3
Gendered Learning Outcomes	Delphi Method and Challenge-Based Gamification	3	C7, C16, C31	RQ3
		2	C22, C29	RQ3
		13	C2, C3, C4, C5, C12, C13, C14, C19, C22, C26, C27, C31, C33, C36, C37, C38	RQ2; RQ3

(Author's own work).
*Codes of study are in Table 54.

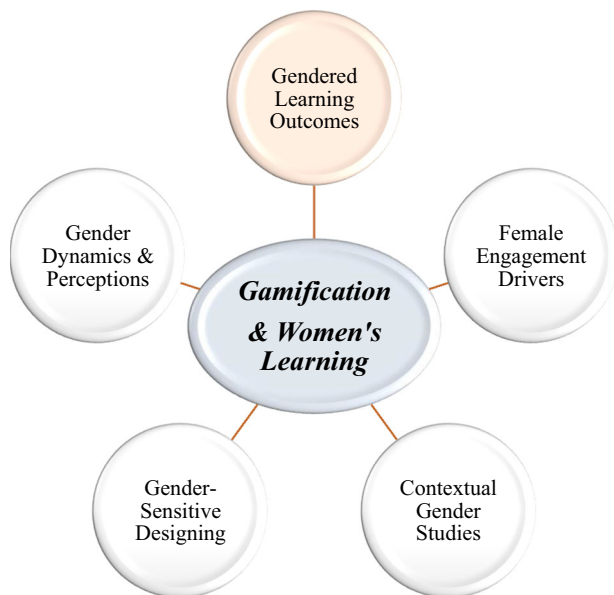


Fig. 3 Five primary themes identified in designing a gamified learning environment for women.

marginalisation (Codish et al. 2017; Tamrin et al. 2022; RQ4). Supportive and fair learning environments are also necessary in case of negative emotional experiences of female learners (Pedro et al. 2015; Chen and Wang, 2011). The effectiveness of gamification is empirically proven, and it is possible to propose it in conjunction with the principles of inclusion, empowerment, and equity as the core values (Ismail et al. 2022; Schmid et al. 2022; Senocak et al. 2021; Zahedi et al. 2021). Considerable application can therefore make gamified education a motivation and engagement tool with respect to gendered learning experiences.

Female engagement drivers in gamified learning

Engagement and motivation for female learners. Gamification redefines women's learning settings through active engagement when tailored to their needs. Females show higher engagement in environments offering choices, teamwork, and feedback (Alsofyani 2022; Rodrigues et al. 2024).

It fosters intrinsic motivation via self-determination theory elements—autonomy, mastery, and relatedness—with women favouring personalisation, storytelling, and team quests (Almusharraf et al. 2023; Alsofyani 2022; Brull and Ruitter 2016; Legaki et al. 2020).

Extrinsic rewards like badges work best for personal progress/social bonding over competition (Codish et al. 2017; Tamrin et al. 2022; Rodrigues et al. 2024; Legaki et al. 2020).

Equitable design aligns elements with objectives, considers individual differences, and avoids unsupportive competition (Bernik et al. 2019; Almusharraf et al. 2023; Pedro et al. 2015; Chen and Wang 2011). Contextual factors like discipline and inclusive environments moderate effects (Lopez-Martinez et al. 2022; Jones et al. 2019; Zahedi et al. 2021).

Thus, designers should prioritise autonomy, collaboration, emotional support, and inclusive rewards (RQ2).

Teacher Perspectives: Supporting gender equity in gamified learning. Gamification is an effective strategy teachers use to make learning engaging for all students, including females, boosting motivation, engagement, and outcomes (Saez-Lopez et al. 2023; Asiri 2019; Colomo-Magana et al. 2024; Wang et al. 2024).

Female teachers particularly value inclusive, supportive, collaborative, gamified environments (Alsofyani 2022).

Some of the issues associated with implementation are time constraints, gaps in knowledge on design, and curriculum integration (Saez-Lopez et al. 2023; Asiri, 2019; Colomo-Magana et al. 2024). Women teachers have additional setbacks, such as low tech confidence and peer support (Ali et al. 2025).

The solutions need to involve multiple training, support, and preparation of women teachers on equal grounds (Saez-Lopez et al. 2023; Asiri 2019). Equity-based gamification can be promoted by supportive school culture, technological infrastructure, and innovation-friendly institutions.

It is more easily adopted by younger, more tech-savvy teachers; peer networks and communities of practice assist female educators to share gender-sensitive strategies, as well as to address tech and gender challenges (Saez-Lopez et al. 2023; Asiri 2019; Colomo-Magana et al. 2024). Gamification is consistent with active learning of study, problem-solving, and critical thinking – all of which are advantageous to the UAE women.

The teachers acknowledge the potential of gamification, but they require professional development, positive cultures, and resources to overcome gender-related obstacles to improving performance (RQ2) and establishing empowering spaces (RQ3).

Technology Implementation: making gamified learning equitable to women. Gaming is increased with advanced hardware, software and platforms that create barriers of access among women, such as hard-to-use cultural and digital disparities, limited hardware and unreliable internet, among others (RQ3). Online resources should be inclusive in areas where women do not have personal devices and study areas (Özer et al. 2018).

Teacher training builds confidence in gaming tools, enabling effective support for female learners (Cuesta-Cambra et al. 2017).

Gamification boosts women's interest, motivation, and success via interactive/collaborative elements like AR, narrative platforms, and social tools—e.g., AR-CLIL shows positive female results (Çelik et al. 2022; Vidanaralage et al. 2022).

Persistent obstacles (devices, internet, digital literacy) risk widening gender gaps without institutional support (Özer et al. 2018; Cuesta-Cambra et al. 2017).

Therefore, institutions must prioritise equitable access, gender-responsive design, and sustained teacher/student support to realise gamification's potential in reducing knowledge gaps (RQ3).

Contextual gender studies of gamification. In order to foster equity in gamified learning, there is a need to investigate how women's experiences and performance differ in various educational settings, including women's health professions education, language learning, and negotiation (RQ3).

Health professions education. Gamification improves equity/participation in healthcare education for female students, enhancing attitudes toward health issues, empathy, and learning—key in female-dominated fields (Craig et al. 2024). Immersive role-playing helps them grasp patient issues and clinical complexities.

It fosters positive, emotionally significant learning, supporting academic success, professional identity, skill/attitude development, and comprehension of complex medical concepts (Rodríguez-Roca et al. 2023; Wang et al. 2024). Interactive simulations build valued skills like communication, decision-making, and collaborative problem-solving.

Success requires addressing game design, inclusivity, relevance, stereotype threat, under-representation, and emotional support to ensure accessibility and belonging (RQ2, RQ3).

Language learning. Gamification considers the use of elements of a game in the learning of a language that makes the activities more involving, helpful, and captivating to the female students. Females always record more involvement, confidence, and success in the game classes, particularly those that promote collaboration and independence (Almusharraf et al. 2023; Suharno et al. 2023; Yildirim and Karah 2023; Senocak et al. 2021).

It enhances the interest of female students in learning languages in an interactive, narrative and mastery-based way that enhances optimism and confidence.

These reduce stereotype threat, motivating women to take speaking and listening risks despite intimidating classroom or societal dynamics (Suharno et al. 2023; Almusharraf et al. 2023).

Empirical evidence shows gamified simulations with real-time feedback and repeated practice directly improve listening comprehension, speaking fluency, and vocabulary acquisition (Suharno et al. 2023; Yildirim and Karah 2023; Senocak et al. 2021).

Gender-sensitive design is important for women. Objective-aligned activities with clear, constructive feedback, plus teacher support for relevant, inclusive experiences that build cooperation, self-expression, and belongingness support women's learning (Almusharraf et al. 2023; Suharno et al. 2023; Yildirim and Karah 2023) (RQ2, RQ3).

Negotiation. Gamification has been successful in increasing the confidence of women in negotiation. The study by Schmid et al. (2022) indicated that the female students who went through gamified negotiation training were more motivated and engaged than those who went through lectures. The results may be considered significant since negotiation has always been regarded as a male-dominated sphere.

Women who learn about negotiation can be especially benefited through gamified activities designed like role-plays or scenario-based challenges that would enable them to feel in charge and empowered. It should also be noted, however, that not every set of negotiation skills can be entirely aligned with gamification, and results can be seriously affected by the purpose and accessibility of the training programme (Schmid et al. 2022).

In general, gamification appears to be a useful approach to empower women during the negotiation training process to increase motivation, engagement, and self-image. These strategies have the potential to assist women in developing skills, increasing confidence, and negotiating aspects that otherwise might seem to be exclusionary and intimidating (RQ2, RQ3). However, the effects on the objective learning outcomes can be different.

Teacher education and online learning. Gamification in online learning ensures women's equity through teacher training addressing female learners' unique needs. Female teachers gain confidence designing inclusive, engaging experiences with adequate support (Colomo-Magaña et al. 2024; Kyung-Mi O 2022; Suharno et al. 2023).

Educators' capacity to create accommodating, interactive, gender-sensitive digital classrooms determines gamification success for women teachers and students. Female educators value meaningful feedback, teamwork, and inclusive environments fostering belonging. Professional development overcomes resistance through gamification tools, co-design, and gender equity training, opening educators to innovative pedagogies (Kyung-Mi O 2022).

Institutions prioritising equitable tech access, ongoing pedagogical support, and innovation cultures maximise gamification benefits for women in online education (Colomo-Magaña et al. 2024). This success hinges on addressing educators' concerns about gender inclusivity, digital confidence, and stereotype

perpetuation, ensuring equitable adoption of gamified strategies (RQ3).

Therefore, effective online gamification requires comprehensive teacher training, an innovative mindset, and institutional support. These empower female teachers and meet diverse women learners' needs, creating equitable, effective gamified environments.

Designing gender-sensitive gamification. The choice and introduction of the game mechanics are not neutral. They may empower women by making them more competent, independent, and belonging, or they may unintentionally develop barriers. This section focuses on the main elements of gamification by using a gender-sensitive approach to identify the most effective mechanisms in order to support women and provide viable advice on designing a game in a fair and inclusive pattern (RQ3, RQ4).

Game mechanics. Points systems effectively encourage intrinsic motivation and persistence by rewarding task completion and goal achievement, fostering sustained engagement (Alsofyani 2022). For female learners, personal growth and mastery-focused points, rather than competition, align with autonomy and competence needs. These resonate with gender-specific motivation factors described in the framework (RQ2, RQ3).

Leaderboards boost competition and performance but risk frustrating women via stereotype threat and negative comparisons, especially in male-dominated and STEM contexts (Brull and Ruiter 2016). Balancing it with collaboration ensures inclusivity and equity (RQ3, RQ4).

Badges foster pride/achievement, engagement, and motivation among female students without stereotype threat (Codish et al. 2017). Unlike leaderboards, they recognise individual progress, building skill confidence (RQ2).

Progression systems or levels sustain long-term engagement via clear direction and purpose (Tamrin et al. 2022). They foster SDT autonomy and mastery, which are key intrinsic drivers for women (RQ1, RQ2). While systematic progress builds confidence that helps female learners to overcome stereotype threat.

Challenges build critical thinking and problem-solving (Pedro et al. 2015). For female learners, collaborative and diverse versions challenge stereotypes, build agency (RQ4), and inspire learning (RQ3). However, mechanics must be context-appropriate/tested to avoid reinforcing gender barriers (RQ4).

Educational apps. Gender-sensitive applications provide equal opportunities to learn (RQ3). The preferences of males and females in educational apps differ (Cuesta-Cambra et al. 2017). Among female learners emotional resonance and cognitive load have a significant impact on attention and memory. Therefore, it stipulates that designers have to strike a balance between emotional engagement and cognitive sophistication.

In this context, Mohtar et al. (2023) reported that Kahoot! proved to be very effective in non-competitive language learning in the form of a game among women. Although the Quran Pedia application itself was quite user-friendly, it had a certain problem with navigation that disproportionately affected female learners who already possess cultural barriers and limited access to technologies (Khorasanchi et al. 2024). Thus, female learners are empowered and successful in safe and inclusive digital environments. The designers need to focus on emotional appeal to women, the ability to reduce the competitive level and technical accessibility without difficulties. This will also guarantee that gamified applications nurture empowering environments that are safe instead of frustrating (RQ3, RQ4).

Delphi Method and Challenge-Based Gamification. Two most talked-about strategies found in the sample studies to foster gender equity in the learning process include the Delphi method and challenge-based gamification. Their effectiveness mostly depends on the attention paid to designing them appropriately (RQ3, RQ4).

The Delphi method ensures gamified challenges are relevant and female learner-focused through iterative expert feedback. Incorporating gender-diverse specialists identifies and eliminates stereotype-perpetuating elements and barriers (Legaki et al. 2020; Wang et al. 2024). This supports RQ4 by co-creating challenges that challenge—rather than reinforce—traditional gender roles.

Challenge-based gamification, like cooperative problems and quests, boosts engagement and critical thinking (Legaki et al. 2020). Women benefit more from collaboration and collective achievement over competition, aligning with preferences for cooperative and mastery tasks rather than direct rivalry. This fosters belonging through cooperation and story rewards, empowering female learners in inclusive spaces (RQ2, RQ3).

However, challenge-based gamification risks competitive stressors for women. Moreover, Delphi processes risk lengthiness and groupthink. Applied with gender sensitivity, these strategies powerfully promote equity and stereotype reduction in gamified learning (RQ3, RQ4).

Gendered Learning Outcomes. Thoughtfully designed gamified environments enhance female learners' comprehension, recall, and engagement with complex topics (Rodrigues et al. 2024; Khaledi et al. 2024). Women report greater encouragement, enjoyment, and involvement when game elements align with autonomy, mastery, and social connection preferences (Suharno et al. 2023; Jones et al. 2019).

Gamification boosts female self-efficacy and confidence in under-represented fields via supportive feedback and collaborative problem-solving (Zahedi et al. 2021). However, learning outcome impacts remain ambivalent. Some studies have found no achievement differences in gamification compared with traditional methods (Schumid et al. 2020), despite women reporting greater competence and motivation. This suggests gamification excels at making women feel better about themselves and more involved but requires more research on measurable outcomes.

According to a recent study involving the use of escape rooms to impart decision-making within a group of postgraduate nursing students (96.96% females), both game-based and real-world learning were found to help decision-making significantly. The participants indicated a great degree of enthusiasm and believed it to be effective, with no difference in outcomes of any significance between the genders (Vazquez-Calatay et al. 2024).

Women's gamification experiences vary by individual as well as situational factors. Collaboration and storytelling maximise benefits, while competition and pressure reduce competence (Bernik et al. 2019; Almusharraf et al. 2023; Pedro et al. 2015). Stereotype threat cues or absent female characters further undermine outcomes.

Theoretical Contribution

This review contributes a comprehensive gender-sensitive gamified learning framework (Fig. 1), synthesising five traditions: gamification, self-determination theory/motivation, social collaboration, feminist/gender constructs, and cognitive load theory. Unlike prior work, it systematically links them via core variables—autonomy, competence, relatedness, motivation, engagement, social identity, instructional design—demonstrating consistent effects on women's learning outcomes across educational settings.

The framework operationalises the core variables and still allows the unique factors to each tradition. It informs the design of gamification through SDT motivation regulation, realistic social identity and constructivist collaboration, female empowerment and stereotype reduction and cognitive load balancing, all promoting fair, productive learning. It has been developed in a transparent manner by extracting the information by means of thematic extraction, coding and synthesis, which makes it replicable in future research/practice.

The framework provides a systematic way of designing, evaluating, and refining gender-equitable gamified spaces with the help of visual and conceptual integration of traditions. It deals with motivation, engagement, structural barriers, power relations and women-specific cognitive needs – bridging an important gap in the literature with an empirically grounded model. This is a platform of theory-inspired innovation on instructional design, research synthesis and practice.

Practical Implications

Design Recommendations for Educators. The framework offers curriculum developers and educators an explicit model for fairer, efficient gamified learning. Individual activities and feedback build autonomy and competence; team-building fosters relatedness and social identity. Careful instructional design minimises extraneous cognitive load for diverse learners. Additionally, it addresses stereotype threat and structural inequities by identifying power relations and socialisation in learning structures.

Our thematic analysis identifies priorities: collaboration/mastery gameplay, diverse representation/inclusive design, and continuous teacher training and support. Addressing digital access/equity enables all female learners to benefit. Gender gap strategies include balanced cooperation and competition, culturally appropriate avatars, intrinsic motivation enhancement, Universal Design Learning (UDL), and culturally responsive pedagogy. Ethical safeguards like open data, participatory design, and ongoing monitoring mitigate risks like gaming addiction and gender stereotyping.

Implications for women's entrepreneurship and careers.

Gamified learning should be gender sensitive to make it more important to develop the necessary competencies, including autonomy, innovativeness, collaborative problem-solving, opportunity recognition, resilience, and financial self-efficacy, which match the resources considered crucial to the entrepreneurship of women (Jiang and Huang 2023; Guo et al. 2023; Huang et al. 2022; Huang et al. 2025; Saluja et al. 2023; Saluja 2024).

Patriarchal institutionalisation, psychological and limited literacy and access, and ethnic constraints have all been shown to limit women from participating in financial inclusion, but bundled interventions of microfinance, digital technologies, and self-help groups are effective when they increase agency (Saluja et al. 2023). Research on entrepreneurship also suggests that high trajectories of performance are based on the arrangement of innovativeness, networks, psychological capital, and experiential learning, but not individual factors (Jiang and Huang, 2023; Guo et al. 2023; Huang et al. 2022; Huang et al. 2025).

Crowdfunding offers women a financing avenue that is less prone to favouritism and reaches similar or greater success rates by use of captivating stories, social capital, and inclusive design, which gamification can develop, despite possible obstacles of under-representation and network effects (Saluja, 2024).

Gamified curriculum can encourage crowdfunding and entrepreneurial activities like goal-setting and pitching to equip women for these career paths along with promoting financial inclusion (Saluja et al. 2023; Saluja, 2024).

Limitations

Review limitations include small sample sizes, self-reported data, and context-specific samples limiting generalisability. English-language focus risks publication bias, excluding non-English and grey literature. Methodological diversity prevented direct comparisons or meta-analysis.

This review focuses solely on women, neglecting intersectionality (race, ethnicity, class, disability, and age). Limited empirical studies applied intersectional analysis, leaving gaps in understanding how overlapping identities affect gamified learning outcomes.

Future research should conduct larger longitudinal studies on gamification's long-term effects, use mixed-method/intersectional approaches examining gender, race, ethnicity, class, and disability experiences, and prioritise data security and informed consent in gamified system design. Addressing these gaps will ensure fair, effective learning for women and diverse learners.

Key Findings & Conclusion

Gamification impacts female learners via game design, motivation, institutional support, and stereotype reversal. Women excel with autonomy/mastery mechanics (badges, storytelling, group quests, collaboration), fostering accomplishment/belonging (RQ1). Conversely, leaderboards risk stress/self-doubt unless balanced by collaboration/mastery; contextual emotional/social factors shape engagement.

Intrinsic motivation-focused gamification enhances female learners' motivation, self-efficacy, and participation. Though objective gains vary, positive attitudes/perceived competence consistently rise—highlighting gamification's engagement transformation power (RQ2). Positive feedback, collective gains, and task challenges boost women's academic drive and risk-taking.

Equity requires contextual design and institutional support. Women surpass in language, health, negotiation and online training through collaboration, inclusive narratives, autonomy and competence skills. Maximising impact demands continuous teacher training, tech access, and supportive cultures (RQ3). Underutilised but crucial, culturally responsive and feminist pedagogies tackle broader equity and intersectionality.

Gameful design challenges stereotypes via customisable avatars, group achievements/tasks, participatory patterns, empowering women through team rewards, diverse representation, and agency focus (RQ4). Conversely, competitive rankings and lack of diversity perpetuate prejudice.

The synthesised framework integrates self-determination, social identity, intersectionality, feminist pedagogy, and cognitive load theories, guiding designers and practitioners to create gamified environments enhancing women's motivation, engagement, and confidence. Summarising, gamification succeeds through context-sensitive design, institutional inclusivity focus, and stereotype resistance, addressing all research questions.

Data Availability

The data used in this research is available as supplementary files. Any other relevant data is available on request.

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Author contributions

OBS: (Corresponding Author) Conceptualization, Designing, Methodology, Software, Data curation, Investigation, Writing- Original draft preparation. DS: Conceptualization, Designing, Methodology, Software, Data curation, Investigation, Writing- Original draft preparation. HK: Conceptualization, Designing, Visualization, Investigation, Software, Validation, Writing- Reviewing and Editing. MMS: Conceptualization, Designing, Visualization, Investigation, Software, Validation, Writing- Reviewing and Editing. These authors contributed equally to this work.

Competing interests

The authors declare no competing interests.

Ethical Approval

This study is a systematic review of previously published empirical research. It did not involve the collection of primary data from human participants or animals. Therefore, ethical approval from an institutional review board or ethics committee was not required.

Informed consent

Informed consent was not applicable to this study as it involved the analysis of data and findings reported in previously published literature only.

Additional information

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Correspondence and requests for materials should be addressed to OMIKA BHALLA SALUJA.

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