

Students' Experiences of Gamified Reflective Learning in Gerontology Education: Engagement, Reflection and Acceptance

Normala Riza^{1*}, Muhamad Fazil Ahmad¹, Siti Hajar Abdul Rauf¹, Azlini Chik¹

¹Faculty of Applied Social Sciences, Universiti Sultan Zainal Abidin, 21300 Kuala Nerus, Terengganu, Malaysia

*Corresponding Author

DOI: <https://doi.org/10.47772/IJRISS.2026.1026EDU0524>

Received: 14 August 2026; Accepted: 20 August 2026; Published: 25 August 2026

ABSTRACT

Reflective learning is an important component of social work and gerontology education, yet students may experience difficulty progressing beyond descriptive reflection. This study evaluated students' experiences of a gamified reflective learning intervention, the Gamified Reflective Learning Application (GRL-App), implemented in an undergraduate Gerontological Services course at a Malaysian university. A descriptive evaluative design was employed involving 68 third-year social work students who completed a post-intervention questionnaire. The original questionnaire comprised 35 items across seven dimensions; however, due to conceptual overlap between Platform Satisfaction and GRL-App Acceptance, 30 items representing six dimensions were retained for the final analysis: motivation, engagement, creativity, reflective ability, empathy, and GRL-App acceptance. Descriptive statistics and Cronbach's alpha were used to examine students' responses and the internal consistency of the six dimensions. One-way analysis of variance (ANOVA), with Welch's ANOVA where the homogeneity of variance assumption was not met, was also conducted to examine whether students' experiences differed according to their previous exposure to gamification applications. All six dimensions demonstrated good to excellent internal consistency, with Cronbach's alpha coefficients ranging from .843 to .952. Students reported positive experiences across all dimensions, with mean scores ranging from 4.25 to 4.61. Empathy recorded the highest mean score ($M = 4.61$, $SD = 0.48$), followed by GRL-App acceptance ($M = 4.51$, $SD = 0.53$) and motivation ($M = 4.46$, $SD = 0.48$). No statistically significant differences were observed across the six dimensions according to students' previous gamification experience (all $p > .05$). The findings indicate that students were generally receptive to the integration of gamification with structured reflective learning and that these positive perceptions were broadly comparable across different levels of previous gamification experience. However, as the findings are based on self-reported post-intervention perceptions without a comparison group or pre-intervention measures, they should not be interpreted as evidence of measurable learning gains. Further research using comparative, longitudinal, qualitative, and performance-based approaches is recommended to examine the educational effects of gamified reflective learning.

Keywords: Gamified Reflective Learning, Gamification, Reflective Learning, Gerontology Education, Social Work Education

INTRODUCTION

Reflective learning is widely recognised as an important pedagogical process in higher education, particularly in disciplines that require students to connect theoretical knowledge with professional judgement and real-world experiences. Through reflection, students are encouraged to examine their learning experiences, reconsider assumptions, and develop more critical and meaningful understandings of complex situations. Contemporary higher education increasingly emphasises learning experiences that promote critical thinking, problem-solving, active participation, and meaningful engagement rather than passive knowledge acquisition (Lin et al., 2021; Almulla & Al-Rahmi, 2023). Nevertheless, conventional reflective activities do not always

achieve these outcomes. When reflection is treated primarily as a routine post-learning task, students may focus on completing the required activity rather than critically examining what they have learned and how that knowledge relates to practice. This creates a pedagogical challenge in designing reflective activities that are both intellectually meaningful and sufficiently engaging to sustain students' participation.

This challenge is particularly relevant to social work and gerontology education. Learning about ageing involves more than acquiring factual knowledge about older adults; students must also develop the capacity to understand ageing within diverse personal, relational, social, and cultural contexts. Reflective learning provides an important mechanism through which students can examine their own assumptions about ageing, relate theoretical concepts to the lived experiences of older adults, and develop greater sensitivity towards issues affecting older people. This is especially important given the persistence of ageism and stereotypical perceptions of older adults among students entering health and social service professions. Educational interventions that expose students to ageing-related experiences and encourage meaningful engagement have therefore become increasingly important in challenging ageist attitudes and strengthening understanding of older adults (Bétrisey et al., 2024). Critical reflection is also particularly relevant to social work and gerontology because professional learning requires students to consider relationships, context, values, lived experience, and their own position within practice situations (Mackell, 2024).

However, the educational value of reflection depends substantially on its depth and quality. Simply asking students to write about an experience does not necessarily result in critical reflection. Students may remain at a descriptive level by recounting events or summarising what they have learned without analysing why an experience matters, questioning their assumptions, or connecting their observations with broader theoretical and professional perspectives. Difficulties in articulating ideas and engaging meaningfully with reflective writing may further limit the depth of students' responses, particularly when reflective activities are perceived as conventional written assignments rather than as an evolving learning process. Consequently, educators face the challenge of moving students beyond surface-level description towards more analytical and critical forms of reflection.

The rapid expansion of digital education provides opportunities to redesign how reflective learning is facilitated. Digital learning environments can offer greater flexibility, accessibility, interaction, and opportunities for students to participate in learning beyond conventional classroom settings. The increasing integration of digital technologies in higher education has also encouraged educators to reconsider traditional pedagogical practices and develop learning environments that are more responsive to contemporary students' learning behaviours and expectations (Alenezi et al., 2023). More recent developments similarly demonstrate that digital learning is increasingly characterised by the integration of interactive technologies, learner-centred approaches, and innovative pedagogical strategies designed to create more flexible and meaningful learning experiences (Zou et al., 2025). However, transferring a conventional reflective task onto a digital platform alone may not necessarily improve engagement or reflective quality. The pedagogical design of the digital activity remains critical.

One approach that may strengthen the design of digital reflective learning is gamification, which involves incorporating game-related elements into non-game learning environments. Common elements include points, badges, challenges, levels, feedback, and indicators of progress (Christopoulos & Mystakidis, 2023). Evidence from systematic reviews and meta-analyses suggests that appropriately designed gamification can contribute positively to student motivation, engagement, participation, and learning outcomes (Sailer & Homner, 2020; Zainuddin et al., 2020; Huang et al., 2020). Importantly, the educational value of gamification extends beyond simply making learning enjoyable; game elements can provide students with visible goals, feedback, recognition, and a sense of progression. When embedded within a reflective learning process, these mechanisms may provide a structured way of encouraging students to participate consistently while progressing through a series of meaningful reflective activities.

Although emerging studies have begun to explore the integration of gamification with reflective learning, evidence remains limited within social work and gerontology education (Topu, 2023; Caldas et al., 2026; Larsen & Al-Farsi, 2026). Existing studies have largely been situated in other disciplinary contexts or have focused on selected outcomes such as engagement, reflective thinking, or academic achievement (Alam et al.,

2023; Caldas et al., 2026; Larsen & Al-Farsi, 2026). Less is known about how social work students experience gamified reflective learning in gerontology education across multiple cognitive, affective, and technological dimensions.

To address this gap, this study evaluates a structured gamified reflective learning intervention situated specifically within undergraduate gerontology education. Unlike studies that focus primarily on motivation, engagement, or academic achievement, the present study adopts a multidimensional perspective by examining six aspects of students' learning experiences: motivation, engagement, creativity, reflective ability, empathy and GRL-App acceptance. This broader focus is particularly relevant in gerontology education, where learning involves not only cognitive engagement but also sensitivity towards the experiences and perspectives of older adults. The study therefore aimed to evaluate students' experiences of gamified reflective learning following the implementation of the Gamified Reflective Learning Application (GRL-App) in an undergraduate Gerontological Services course. The findings are expected to provide preliminary evidence on how gamified reflective learning is experienced across cognitive, affective, engagement, and technology-related dimensions in social work and gerontology education.

LITERATURE REVIEW

Reflective Learning in Social Work and Gerontology Education

Reflective learning is a fundamental component of social work education because professional competence requires students to move beyond the acquisition of theoretical knowledge towards the ability to interpret experiences, examine assumptions, and connect classroom learning with practice. Reflective pedagogy provides a mechanism for integrating academic and field-based learning, enabling students to make sense of complex practice situations and develop competencies required for professional social work (McGuire & Lay, 2020). Reflective writing can further support active learning by creating opportunities for students to revisit their experiences, articulate their understanding, and engage more deliberately with course content (Christensen & Wärnsby, 2023). Beyond supporting academic learning, reflection also contributes to the development of professional identity. Björktomta and Tham (2024) demonstrate the value of reflective writing as a tool through which social work students can explore and construct their emerging professional identities.

An important distinction, however, exists between simply engaging in reflection and developing critical reflection. Critical reflection requires students to examine underlying assumptions, perspectives, values, and contextual influences rather than merely describing an experience. This distinction is particularly important in social work, where professional practice frequently involves complex interactions between individuals and broader social environments. A scoping review by Reid et al. (2024) highlights the continuing importance of critical reflection within social work education while also drawing attention to how it is conceptualised and taught. Consequently, reflective learning should not be viewed merely as a written academic exercise, but as a developmental process through which students learn to critically interpret knowledge and professional experiences.

Reflective learning is equally relevant in gerontology education, where students must develop an understanding of ageing that extends beyond biomedical or theoretical knowledge. Learning about older adults requires students to consider the diversity of ageing experiences, social contexts, relationships, values, and their own assumptions towards later life. Importantly, Sheppard et al. (2022) specifically examined critical reflection skills within an undergraduate gerontology course, demonstrating the relevance of incorporating reflection into gerontological learning. More recent developments in gerontology education have also emphasised experiential and learner-centred approaches that connect formal learning with meaningful exposure to ageing-related contexts (Yamashita et al., 2026). Such approaches are particularly valuable because students' understanding of ageing can be influenced not only by academic knowledge but also by their prior experiences and perceptions of older adults.

The affective dimension of gerontology education is also important. Educational experiences involving older adults and intergenerational engagement can provide opportunities for students to reconsider stereotypes and develop more nuanced perceptions of ageing. Hong (2026), for example, examined an intergenerational and

culturally grounded educational approach aimed at reducing ageism and strengthening students' willingness to engage in caregiving. This reinforces the broader need for gerontology education to address not only what students know about ageing, but also how they perceive, interpret, and respond to older adults. Within this context, reflective learning offers an important pedagogical mechanism for integrating cognitive learning with critical awareness and the affective dimensions of learning about ageing.

Digital Reflective Learning

The increasing integration of digital technologies in education has expanded opportunities for reflective learning beyond conventional written journals and classroom-based activities. Digital environments can provide students with more flexible spaces to document experiences, revisit their learning, organise reflective thoughts, and engage with learning activities over time. In higher education, digital reflective journals have been introduced as tools that support students' self-assessment and provide a structured means of documenting and reviewing their learning experiences (Luștrea et al., 2024). More broadly, technology-enhanced pedagogies can facilitate active participation, collaboration, critical thinking, and more learner-centred learning experiences when digital tools are meaningfully integrated into instructional design (Kholid, 2026).

The educational value of digital reflection, however, depends on how technology is incorporated into the learning process. Moving reflective activities from paper-based formats to digital platforms does not necessarily guarantee meaningful reflection or sustained student engagement. Digital tools are most useful when they provide opportunities for students to interact with learning content, revisit their experiences, and participate actively in the reflective process. Evidence from technology-supported reflective learning suggests that appropriately integrated digital tools can facilitate reflection while creating more interactive learning experiences (Kadyrova et al., 2025). Thus, the role of technology should extend beyond serving merely as a medium for submitting reflective tasks.

Consequently, effective digital reflective learning requires pedagogical strategies that encourage students to participate consistently and perceive reflection as a developmental learning process rather than a repetitive academic requirement. One potential strategy is the incorporation of gamification, where elements such as challenges, points, achievement recognition, feedback, and progression are integrated into learning activities. Such an approach may complement digital reflection by providing additional structure and motivation for continued participation. This provides the basis for considering the role of gamification in higher education.

Gamification in Higher Education

Gamification has become an increasingly adopted pedagogical strategy in higher education, particularly as educators seek to create more engaging and participatory learning environments. It generally involves the integration of game-related elements into non-game educational contexts to support particular learning behaviours and experiences. Common elements include points, badges, challenges, levels, rewards, feedback, and indicators of progression, which can be incorporated into learning activities to provide learners with goals, recognition, and a visible sense of achievement (Christopoulos & Mystakidis, 2023). Rather than transforming learning entirely into a game, gamification uses selected game mechanisms to enhance the design and delivery of existing educational activities.

A major rationale for incorporating gamification into higher education is its potential to strengthen students' motivation and engagement. Evidence from systematic reviews and meta-analyses indicates that gamification can positively influence motivational and learning-related outcomes when appropriately integrated into educational settings (Sailer & Homner, 2020; Zainuddin et al., 2020; Huang et al., 2020). Empirical evidence also demonstrates its potential to promote motivation and engagement among university students. For example, Chans and Portuguese Castro (2021) reported the use of gamification as a strategy for increasing motivation and engagement among higher education chemistry students. Similarly, Rivera and Garden (2021) highlighted the role of gamification in supporting student engagement, while emphasising the importance of considering how gamified experiences are structured within the learning environment.

Nevertheless, the educational value of gamification cannot be attributed merely to the presence of points, badges, or rewards. Its effectiveness depends on how game elements are aligned with pedagogical objectives

and integrated into meaningful learning activities. An excessive emphasis on external rewards may encourage participation without necessarily promoting deeper engagement with learning content. Therefore, the value of gamification lies not only in motivating students to complete activities but also in its potential to structure and support meaningful learning processes. This consideration is particularly relevant to reflective learning, where participation alone is insufficient and students are expected to engage thoughtfully with their experiences, knowledge, and perspectives. The integration of gamification with reflective learning therefore warrants further consideration.

Gamified Reflective Learning and Student Learning Experience

Gamified reflective learning brings together the motivational features of gamification and the deeper cognitive processes associated with reflection. While gamification is often used to encourage participation and engagement, its educational value may be greater when game elements are integrated with activities that require students to examine experiences, consider alternative perspectives, and make meaningful connections between theory and practice. In this sense, gamification can provide a structure that encourages participation, while reflective activities give that participation a clear learning purpose.

Emerging research supports the use of gamification in reflective learning contexts. Caldas et al. (2026), for example, demonstrated how gamification could be incorporated into nursing clinical supervision to facilitate critical reflective thinking. Similarly, Topu (2023) found that gamification influenced the engagement of both active and reflective learners, highlighting the importance of considering different ways in which students interact with gamified learning environments. Shaheen et al. (2022) further emphasised the value of embedding reflection within game-based learning design rather than treating reflection as an activity that occurs separately from the learning experience.

However, students' experiences of gamified learning extend beyond motivation and engagement. Satisfaction with the learning environment, acceptance of the technology, creativity, reflective ability, and affective responses may also shape how students experience an intervention. Research on gamified learning environments has increasingly recognised this broader perspective. Alam et al. (2023), for instance, examined students' experiences with a gamified learning analytics dashboard alongside academic achievement, while Khaldi et al. (2023) showed that gamification in higher education involves diverse technologies, game elements, and pedagogical approaches. Evaluating multiple dimensions of the student learning experience may therefore provide a more meaningful understanding of how learners respond to gamified reflective learning than focusing on engagement or motivation alone.

This broader perspective is particularly relevant to gerontology and social work education, where reflective learning involves both cognitive and affective dimensions. Students are expected not only to understand concepts related to ageing but also to reflect on the experiences, needs, and perspectives of older adults. Despite growing research on gamification in higher education, relatively little attention has been given to the integration of gamification with structured reflective learning in gerontology education. This gap provides the basis for examining how students experience a gamified reflective learning approach across dimensions such as motivation, engagement, creativity, reflective ability, empathy, and acceptance of the intervention.

MATERIALS AND METHODS

Research Design and Participants

This study employed a quantitative descriptive evaluative design to examine students' experiences following participation in a gamified reflective learning intervention. The study was conducted among undergraduate social work students enrolled in the Gerontological Services (CWS30703) course at Universiti Sultan Zainal Abidin (UniSZA), Malaysia. The course introduces students to key aspects of gerontology and services for older adults while encouraging them to relate theoretical knowledge to ageing-related issues and real-life contexts.

The Gamified Reflective Learning Application (GRL-App) was incorporated into the course as a structured digital reflective learning activity. Following the intervention, students were invited to complete a post-

intervention questionnaire evaluating their learning experiences. A total of 68 students completed the post-intervention survey and were included in the present analysis. Participation in the survey was voluntary, and the responses were collected for the purpose of evaluating students' experiences with the gamified reflective learning approach.

GRL-App Gamified Reflective Learning Intervention

The GRL-App was developed as a gamified reflective learning approach to transform conventional post-lecture reflection into a more structured and engaging learning experience. Rather than completing reflection solely as a conventional written task, students participated in a series of topic-based reflective activities linked to the content of the Gerontological Services course. The activities required students to relate concepts learned in class to ageing-related situations, experiences, and issues involving older adults and caregiving.

Gamification elements were incorporated into the reflective learning process to encourage sustained participation and provide students with a sense of progression. These included reflective challenges, experience points (XP), achievement recognition or badges, feedback, and indicators of learning progress. Students completed reflective activities throughout the learning period, while lecturer feedback was used to guide their engagement with the reflection tasks. The intervention was delivered through an accessible digital learning environment, allowing students to participate in and document their reflective activities online.

Importantly, gamification was used as a supporting pedagogical mechanism rather than as an end in itself. The GRL-App was designed to maintain students' engagement with reflective activities while encouraging them to connect gerontological knowledge with real-life ageing contexts and consider issues from broader personal and social perspectives.

Instrument and Data Collection

Data were collected using a structured post-intervention questionnaire administered through Google Forms following students' participation in the GRL-App activities. The original questionnaire comprised 35 items covering seven dimensions of students' experiences with the gamified reflective learning intervention: motivation, engagement, creativity, reflective ability, empathy, platform satisfaction, and GRL-App acceptance.

During the preparation of the present analysis, conceptual overlap was identified between the Platform Satisfaction and GRL-App Acceptance dimensions, particularly in relation to students' satisfaction, willingness to continue using the approach, and willingness to recommend it. To avoid redundancy between conceptually similar constructs, Platform Satisfaction was excluded from the present analysis. GRL-App Acceptance was retained because it was more directly aligned with the primary focus of the study, namely students' acceptance of the gamified reflective learning intervention. The final analysis therefore included 30 items across six dimensions: motivation, engagement, creativity, reflective ability, empathy, and GRL-App acceptance. Each dimension consisted of five items rated on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Table 1. Constructs and Items Included in the Final Analysis

Construct	No. of Items	Scale
Motivation	5	1–5
Engagement	5	1–5
Creativity	5	1–5
Reflective Ability	5	1–5
Empathy	5	1–5
GRL-App Acceptance	5	1–5
Total	30	

The six constructs represented complementary aspects of students' experiences with gamified reflective

learning. Motivation assessed students' interest, enthusiasm, and willingness to participate in the reflective activities, while engagement focused on their involvement, attention, participation, and commitment during the learning process. Creativity assessed students' perceptions of whether the activities encouraged them to generate ideas, explore different perspectives, and express their understanding in creative ways. Reflective ability focused on students' perceived ability to critically examine their learning experiences, evaluate their own understanding, and connect theoretical knowledge with real-life situations. Empathy assessed students' perceived understanding of older adults' feelings and life experiences, sensitivity towards the challenges faced by older adults, ability to consider situations from older adults' perspectives, concern for their well-being, and recognition of their dignity and right to respect. GRL-App acceptance assessed students' overall acceptance of the intervention, including perceived ease of use, whether the approach made learning more interesting, and their willingness to use or recommend a similar gamified reflective learning approach.

The questionnaire was distributed electronically following completion of the intervention. A total of 68 students completed the post-intervention questionnaire, and all complete responses were included in the analysis.

Data Analysis

Data were analysed using descriptive and inferential statistical procedures. Means and standard deviations were calculated to summarise students' responses across the six dimensions retained in the final analysis: motivation, engagement, creativity, reflective ability, empathy, and GRL-App acceptance. Higher mean scores indicated more positive student experiences with the gamified reflective learning intervention. The internal consistency of each dimension was assessed using Cronbach's alpha coefficient. Reliability analysis was conducted separately for the six dimensions, and the resulting coefficients were used to determine the consistency of the items within each dimension.

To examine whether students' experiences differed according to their previous exposure to gamification applications, group comparisons were conducted across the six dimensions. Students were grouped according to their reported level of previous gamification experience (little, moderate, or extensive). One-way analysis of variance (ANOVA) was used to compare mean scores across the three groups. Homogeneity of variance was assessed using Levene's test, and Welch's ANOVA was used where the assumption of equal variances was not met. Statistical significance was set at $p < .05$.

RESULTS AND DISCUSSION

Profile of Participants

A total of 68 undergraduate social work students completed the post-intervention questionnaire and were included in the analysis. The majority of participants were female (91.2%), while 8.8% were male. Participants ranged in age from 22 to 26 years, with a mean age of 23.18 years ($SD = 0.65$). Most participants were 23 years old (88.2%). All participants (100%) were third-year students. Regarding previous experience with gamification applications, more than half of the participants (57.4%) reported a moderate level of experience, while 32.4% reported having little experience and 10.3% reported having extensive experience. Overall, the findings indicate that most participants had some prior exposure to gamification applications, although only a small proportion reported extensive experience.

Table 2. Demographic Profile of Participants (N = 68)

Characteristics	Frequency (n)	Percentage (%)
Gender		
Female	62	91.2
Male	6	8.8
Age (years)		
22	1	1.5
23	60	88.2

24	3	4.4
25	2	2.9
26	2	2.9
Year of Study		
Year 3	68	100.0
Previous Experience with Gamification Applications		
Little	22	32.4
Moderate	39	57.4
Extensive	7	10.3

Reliability of Study Measures

The internal consistency of the six constructs retained in the final analysis was assessed using Cronbach's alpha. As shown in Table 3, all constructs demonstrated good to excellent internal consistency, with coefficients ranging from .843 to .952. Empathy recorded the highest reliability coefficient ($\alpha = .952$), followed by GRL-App Acceptance ($\alpha = .937$), Motivation ($\alpha = .916$), Creativity ($\alpha = .909$), and Reflective Ability ($\alpha = .883$). Engagement recorded the lowest coefficient ($\alpha = .843$), although this value still indicated good internal consistency.

Table 3. Reliability of Study Measures

Construct	No. of Items	Cronbach's α
Motivation	5	.916
Engagement	5	.843
Creativity	5	.909
Reflective Ability	5	.883
Empathy	5	.952
GRL-App Acceptance	5	.937

Students' Experiences of Gamified Reflective Learning

Table 4 presents the descriptive statistics for the six dimensions of students' experiences following their participation in the GRL-App. Overall, students reported positive experiences across all dimensions, with mean scores ranging from 4.25 to 4.61 on a five-point scale. Empathy recorded the highest mean score ($M = 4.61$, $SD = 0.48$), followed by GRL-App Acceptance ($M = 4.51$, $SD = 0.53$), Motivation ($M = 4.46$, $SD = 0.48$), Creativity ($M = 4.38$, $SD = 0.51$), and Reflective Ability ($M = 4.35$, $SD = 0.47$). Although Engagement recorded the lowest mean score ($M = 4.25$, $SD = 0.51$), it remained positively rated relative to the five-point response scale. Collectively, the findings indicate generally favourable student perceptions across the cognitive, affective, engagement, and intervention-related dimensions assessed in the study.

Students responded positively to the motivational and engagement aspects of the GRL-App. Motivation recorded a mean score of 4.46 ($SD = 0.48$), suggesting that students generally found the gamified reflective activities stimulating and encouraging. This pattern aligns with previous studies showing that gamification can foster motivation by making learning activities more purposeful, interactive, and rewarding. Chans and Portuguese Castro (2021) reported positive effects of gamification on motivation and engagement among higher education students, while Alonso-Sánchez et al. (2025) similarly found favourable student perceptions of gamified learning in relation to motivation and participation. Together, these studies support the use of thoughtfully designed gamification as a means of encouraging students to take a more active role in their learning.

Engagement was also rated positively ($M = 4.25$, $SD = 0.51$), although it had the lowest mean among the six dimensions assessed. This comparatively lower score does not indicate poor engagement, as students still responded favourably overall. Rather, it points to a possible distinction between feeling motivated by a

gamified activity and remaining consistently engaged throughout the learning process. Rivera and Garden (2021) describe engagement in gamified learning as multidimensional, involving behavioural, cognitive, and affective dimensions. Khaldi et al. (2023) likewise emphasise that learner engagement depends not simply on the presence of game elements but on how these elements are designed and integrated into the learning experience.

In the context of the present study, this distinction is particularly relevant because the GRL-App combined gamification with reflective learning, which requires students to think critically about their experiences, consider different perspectives, and relate course knowledge to real-life situations. Such activities demand more than participation in game-like tasks; they require sustained cognitive involvement. The findings therefore suggest that while students were receptive to the motivational features of the GRL-App, meaningful engagement with reflective learning may depend on how effectively gamification is connected to the reflective tasks themselves. This reinforces the importance of using gamification as part of the pedagogical design rather than relying solely on points, badges, or rewards (Khaldi et al., 2023).

Students also rated reflective ability ($M = 4.35$, $SD = 0.47$) and creativity ($M = 4.38$, $SD = 0.51$) positively. Their responses suggest that the gamified reflective activities provided opportunities to examine learning experiences, consider different perspectives, generate ideas, and connect course knowledge with real-life situations. These processes are central to reflective learning, which goes beyond recalling course content and encourages students to interpret and critically examine their learning experiences. In an undergraduate gerontology course, Sheppard et al. (2022) similarly emphasised the importance of developing students' critical reflection skills. The potential of gamification to complement this process is also evident in the work of Caldas et al. (2026), who incorporated gamification into nursing clinical supervision to support critical reflective thinking. In the present study, students' positive ratings of reflective ability and creativity suggest that they experienced GRL-App as more than simply a gamified activity; they also viewed it as a useful way of engaging with course content through reflection and exploration of ideas.

Of the six dimensions examined, empathy received the highest rating ($M = 4.61$, $SD = 0.48$). This result is particularly meaningful in gerontology education, where learning involves not only understanding ageing-related concepts but also developing sensitivity towards the experiences, needs, and perspectives of older adults. Previous research has demonstrated the importance of educational interventions in challenging stereotypes and prejudices towards older adults among health and social services students (Bétrisey et al., 2024). In the present study, students' responses indicate that they viewed the learning experience positively in relation to understanding older adults' feelings and experiences, considering issues from their perspectives, and recognising their dignity and well-being. Such experiences are especially relevant for social work students, who may encounter older adults and their families in future professional practice.

Taken together, the ratings for reflective ability, creativity, and empathy show that students' experiences of GRL-App extended beyond the motivational aspects commonly associated with gamification. By combining gerontological content with structured reflective activities, the approach appears to have engaged students across both cognitive and affective dimensions of learning. These results should nevertheless be interpreted as students' perceptions of their learning experience rather than evidence of actual improvement in reflective ability, creativity, or empathy, as the present analysis relied on post-intervention self-reported data.

GRL-App Acceptance recorded the second-highest mean score among the six dimensions ($M = 4.51$, $SD = 0.53$), indicating that students were generally receptive to the gamified reflective learning intervention. This finding is important because students' willingness to engage with an educational innovation depends not only on the presence of digital or game-based features but also on whether they perceive the approach as useful, accessible, and relevant to their learning experience. Khaldi et al. (2023), in their systematic review of gamification in higher education, demonstrated that gamified learning environments vary considerably in their technologies, game elements, and pedagogical approaches, reinforcing the importance of aligning gamification with the intended learning context and educational purpose.

In the present study, the positive acceptance rating suggests that students were receptive to the broader approach of integrating gamification with structured reflective learning in gerontology education. Nevertheless,

this result represents students' self-reported acceptance of the intervention rather than evidence of its effectiveness. Further research using comparative, longitudinal, or performance-based measures is needed to determine whether such acceptance is accompanied by measurable improvements in reflective learning outcomes.

Table 4. Students' Experiences of Gamified Reflective Learning (N = 68)

Dimension	Mean	SD
Empathy	4.61	0.48
GRL-App Acceptance	4.51	0.53
Motivation	4.46	0.48
Creativity	4.38	0.51
Reflective Ability	4.35	0.47
Engagement	4.25	0.51

Previous Gamification Experience and Students' Learning Experiences

To examine whether students' experiences differed according to their previous exposure to gamification applications, mean scores across the six dimensions were compared among students reporting little ($n = 22$), moderate ($n = 39$), and extensive ($n = 7$) previous gamification experience. As shown in Table 5, no statistically significant differences were observed for motivation, engagement, creativity, reflective ability, or GRL-App acceptance across the three groups (all $p > .05$). The assumption of homogeneity of variance was met for these dimensions.

For empathy, Levene's test indicated that the homogeneity of variance assumption was not met ($p = .037$). Welch's ANOVA was therefore used and similarly showed no statistically significant difference in empathy scores according to previous gamification experience, Welch's $F(2, 18.35) = 1.47$, $p = .256$. Overall, these findings indicate that students' evaluations of the GRL-App across the six dimensions were broadly comparable regardless of their level of previous exposure to gamification applications.

The absence of significant differences across the six dimensions suggests that students' experiences of the GRL-App were broadly comparable regardless of their previous exposure to gamification applications. Although students with extensive previous experience showed descriptively higher mean scores for several dimensions, particularly motivation, engagement, creativity, and GRL-App acceptance, these differences were not statistically significant and should therefore be interpreted cautiously, especially given the small number of students in the extensive-experience group. This finding is consistent with Alnuaim (2024), who similarly found no statistically significant difference in undergraduate students' acceptance of gamified learning according to their prior experience with gamification. The present study extends this observation by showing a similar pattern not only for GRL-App acceptance but also for motivation, engagement, creativity, reflective ability, and empathy. Positive perceptions of the GRL-App therefore appeared not to be confined to students who were already highly familiar with gamified learning. From a pedagogical perspective, this suggests that the approach may be accessible to students with varying levels of prior gamification experience. However, further research with larger and more balanced experience groups is needed before firm conclusions can be drawn regarding the role of prior gamification experience in shaping students' responses to gamified reflective learning.

Table 5. Students' Experiences According to Previous Gamification Experience (N = 68)

Dimension	Little ($n=22$) M (SD)	Moderate ($n=39$) M (SD)	Extensive ($n=7$) M (SD)	F	p
Motivation	4.41 (0.40)	4.44 (0.53)	4.74 (0.44)	1.39	.257
Engagement	4.12 (0.46)	4.27 (0.52)	4.57 (0.54)	2.24	.114
Creativity	4.35 (0.47)	4.35 (0.53)	4.66 (0.47)	1.16	.321

Reflective Ability	4.38 (0.39)	4.31 (0.50)	4.43 (0.54)	0.27	.766
Empathy^a	4.68 (0.42)	4.53 (0.52)	4.80 (0.38)	1.47	.256
GRL-App Acceptance	4.57 (0.49)	4.44 (0.57)	4.71 (0.40)	1.05	.355

Note: ^a Welch's ANOVA was reported for empathy because the homogeneity of variance assumption was violated. For all other dimensions, conventional one-way ANOVA was used. $p < .05$ was considered statistically significant.

Educational Implications and Limitations

Several limitations should be considered when interpreting the findings. First, the study involved a relatively small sample of 68 students from a single course and institution, with all participants being third-year social work students and the majority being female. The findings therefore may not be generalisable to students from other programmes, institutions, or educational contexts. Second, the study relied on self-reported post-intervention perceptions rather than objective measures of learning outcomes. Although the questionnaire provided a structured assessment of students' experiences across the six dimensions, the findings should not be interpreted as evidence of actual improvement in motivation, engagement, creativity, reflective ability, empathy, or acceptance of the intervention. Third, the study relied exclusively on quantitative questionnaire data and therefore did not capture students' individual explanations of how or why particular features of the GRL-App influenced their reflective learning experiences. Future studies could incorporate qualitative interviews, focus groups, or analysis of students' reflective entries to provide a richer understanding of how students experience gamified reflection. Finally, the absence of a comparison group and pre-intervention measures limits the ability to determine whether the observed positive perceptions can be attributed specifically to the GRL-App. Future research should therefore consider comparative or longitudinal designs, larger and more diverse samples, and objective or performance-based assessments of reflective learning to provide stronger evidence regarding the educational effects of gamified reflective learning.

CONCLUSION

This study examined students' experiences of gamified reflective learning through the implementation of the GRL-App in an undergraduate Gerontological Services course. Students reported positive experiences across all six dimensions, with empathy receiving the highest rating, followed by GRL-App acceptance and motivation. Although engagement received the lowest mean score, it remained positively rated overall. These findings suggest that students were receptive to the integration of gamification with structured reflective learning in gerontology education.

Importantly, students' experiences extended beyond motivation and engagement to include reflective ability, creativity, and empathy, which are particularly relevant to learning in social work and gerontology. Students' evaluations across the six dimensions also did not differ significantly according to their level of previous gamification experience, suggesting that positive perceptions of the GRL-App were not limited to students who were already highly familiar with gamified learning. However, this finding should be interpreted cautiously given the small and unequal sizes of the experience groups.

Overall, the GRL-App represents a promising pedagogical approach for structuring reflective activities while maintaining student engagement with gerontology-related learning. Nevertheless, the findings reflect students' self-reported perceptions rather than evidence of measurable learning gains. Further research involving larger and more diverse samples, comparison groups, pre- and post-intervention measures, qualitative data, and performance-based assessments is needed to determine whether gamified reflective learning contributes to the development of reflective competencies, empathy, and other learning outcomes over time.

ACKNOWLEDGEMENT

This project was supported by Universiti Sultan Zainal Abidin (UniSZA) under the Scholarship of Teaching and Learning (SoTL) Research Grant (UniSZA/2025/SoTL/19).

REFERENCES

1. Alam, M. I., Malone, L., Nadolny, L., Brown, M., & Cervato, C. (2023). Investigating the impact of a gamified learning analytics dashboard: Student experiences and academic achievement. *Journal of Computer Assisted Learning*, 39(5), 1436-1449. <https://doi.org/10.1111/jcal.12853>
2. Alenezi, M., Wardat, S., & Akour, M. (2023). The need of integrating digital education in higher education: Challenges and opportunities. *Sustainability*, 15(6), 4782. <https://doi.org/10.3390/su15064782>
3. Almulla, M. A., & Al-Rahmi, W. M. (2023). Integrated social cognitive theory with learning input factors: The effects of problem-solving skills and critical thinking skills on learning performance sustainability. *Sustainability*, 15(5), 3978. <https://doi.org/10.3390/su15053978>
4. Alnuaim, A. (2024). The impact and acceptance of gamification by learners in a digital literacy course at the undergraduate level: Randomized controlled trial. *JMIR Serious Games*, 12, e52017. <https://doi.org/10.2196/52017>
5. Alonso-Sánchez, J. A., Núñez Alonso, J. L., & Santana-Monagas, E. (2025). Gamification in higher education: A case study in educational sciences. *TechTrends*, 69, 507–518. <https://doi.org/10.1007/s11528-025-01056-2>
6. Bétrisey, C., Scott, J., Groleau, M., Caron, C., Yip, K., Bourgault, C., ... & Levasseur, M. (2024). Contexts, mechanisms and outcomes of interventions to counter ageism toward older adults in undergraduate health and social services students: Results of a realist review. *Educational Gerontology*, 50(7), 565-593. <http://dx.doi.org/10.1080/03601277.2024.2325722>
7. Björktomta, S. B., & Tham, P. (2024). Building professional identity during social work education: The role of reflective writing as a tool. *Social Work Education*, 43(9), 2847-2864. <https://doi.org/10.1080/02615479.2023.2297778>
8. Caldas, S., Gonçalves, R., Silva, R., Taveira, A., & Macedo, A. P. (2026). Gamification as a strategy in nursing clinical supervision for developing critical reflective thinking. *International Journal of Nursing Sciences*, 13(1), 68-76. <https://doi.org/10.1016/j.ijnss.2025.12.008>
9. Chans, G. M., & Portuguese Castro, M. (2021). Gamification as a strategy to increase motivation and engagement in higher education chemistry students. *Computers*, 10(10), 132. <https://doi.org/10.3390/computers10100132>
10. Christensen, J., & Wärensby, A. (2023). Reflective writing in course design for active learning in social work education. *Journal of Social Work Education*, 59(3), 756-771. <https://doi.org/10.1080/10437797.2023.2213285>
11. Christopoulos, A., & Mystakidis, S. (2023). Gamification in education. *Encyclopedia*, 3(4), 1223-1243. <https://doi.org/10.3390/encyclopedia3040089>
12. Hong, H. (2026). Culturally safe intergenerational and music-based learning to reduce ageism and enhance caregiving willingness among Indigenous students: an action research study in Taiwan. *Gerontology & Geriatrics Education*, 1-20.
13. Huang, R., Ritzhaupt, A. D., Sommer, M., Zhu, J., Stephen, A., Valle, N., ... & Li, J. (2020). The impact of gamification in educational settings on student learning outcomes: A meta-analysis. *Educational technology research and development*, 68(4), 1875-1901. <https://doi.org/10.1007/s11423-020-09807-z>
14. Kadyrova, G., Serik, M., Issina, Z., & Yessenova, K. (2025). Enhancing reflective language learning through digital tools: a comparative case study in kazakhstani middle schools. *International Journal of Learning, Teaching and Educational Research*, 24(9), 447-467. <https://doi.org/10.26803/ijlter.24.9.22>
15. Khaldi, A., Bouzidi, R., & Nader, F. (2023). Gamification of e-learning in higher education: a systematic literature review. *Smart learning environments*, 10(1), 10. <https://doi.org/10.1186/s40561-023-00227-z>
16. Kholid, I. (2026). Technology-Enhanced Co-Creative Pedagogies: Transforming Collaboration, Critical Thinking, and Innovation in STEAM Education. *International Journal of Technology in Education*, 9(2), 379-401. <https://doi.org/10.46328/ijte.5182>
17. Larsen, O., & Al-Farsi, A. (2026). From Points to Insight: Gamifying Reflective Thinking in Design Education. *International Journal of Graphic Design*, 4(1), 33-51. <https://doi.org/10.51903/ijgd.v4i1.3206>

18. Lin, H. C., Hwang, G. J., Chang, S. C., & Hsu, Y. D. (2021). Facilitating critical thinking in decision making-based professional training: An online interactive peer-review approach in a flipped learning context. *Computers & Education*, 173, 104266. <https://doi.org/10.1016/j.compedu.2021.104266>
19. Luștreă, A., Dincă, M., Berge, T., Onițiu, A., Thomassen, M., Crașovan, M., & Luchș, D. (2024). The digital reflective journal: a self-assessment tool for higher education students. In *Digital Assessment in Higher Education: Navigating and Researching Challenges and Opportunities* (pp. 259-283). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-97-6136-4_12
20. Mackell, P. (2024). *Becoming Relational with Aboriginal Peoples, Country, and Knowledges in Everyday Situated Moments. A Critical Reflection for Social Work and Gerontology* (Doctoral dissertation, RMIT University).
21. McGuire, L. E., & Lay, K. A. (2020). Reflective pedagogy for social work education: Integrating classroom and field for competency-based education. *Journal of Social Work Education*, 56(3), 519-532. <https://doi.org/10.1080/10437797.2019.1661898>
22. Reid, K., Woodman, E., Trost, W., & Prammar, K. (2024). Beyond a commitment of teaching critical reflection: a scoping review of social work education literature. *Social Work Education*, 43(9), 2824-2846. <https://doi.org/10.1080/02615479.2023.2292140>
23. Rivera, E. S., & Garden, C. L. P. (2021). Gamification for student engagement: a framework. *Journal of further and higher education*, 45(7), 999-1012. <https://doi.org/10.1080/0309877X.2021.1875201>
24. Sailer, M., & Homner, L. (2020). The gamification of learning: A meta-analysis. *Educational psychology review*, 32(1), 77-112. <https://doi.org/10.1007/s10648-019-09498-w>
25. Shaheen, A., Halvorsen, F., & Fotaris, P. (2022, September). A reflective game design framework for game-based learning. In *European Conference on Games Based Learning* (Vol. 16, No. 1, pp. 758-765).
26. Sheppard, C. L., Gilani, J., & Neiterman, E. (2022). Examining critical reflection skills in an undergraduate gerontology course. *Educational Gerontology*, 48(11), 536-548. <https://doi.org/10.1080/03601277.2022.2047505>
27. Topu, F. B. (2023). Effects of gamification on active and reflective learners' engagement and cognitive load. *Journal of Theoretical Educational Sciences*, 16(1), 41-71. <http://doi.org/10.30831/akukeg.1130771>
28. Yamashita, T., Lilly, F. R., Martin, D. B., & Kamijo, M. (2026). Development and Evaluation of the Interdisciplinary Graduate-Level Experiential Global Aging Education Program in the United States: A Case of the Gerontology in Japan Course. *Journal of Global Education and Research*, 10(1), 16-29. <https://www.doi.org/10.5038/2577-509X.10.1.1425>
29. Zainuddin, Z., Chu, S. K. W., Shujahat, M., & Perera, C. J. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. *Educational research review*, 30, 100326. <https://doi.org/10.1016/j.edurev.2020.100326>
30. Zou, Y., Kuek, F., Feng, W., & Cheng, X. (2025, March). Digital learning in the 21st century: trends, challenges, and innovations in technology integration. In *Frontiers in Education* (Vol. 10, p. 1562391). Frontiers Media SA. <https://doi.org/10.3389/feduc.2025.1562391>