

Does Gamification Improve Video-Based Soft Skills Training of Software Engineering Professionals?

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Abstract

Soft skills are essential for software engineers. For example, effective communication and collaboration are critical for the design and delivery of software solutions. However, many organizations lack the resources to systematically support soft skills training. Although video-based training provides a flexible approach, it easily leads to shallow learning. To support engagement, active video watching integrates reflective activities, such as commenting on videos and reviewing peers' comments. Gamifying these activities can further increase engagement. However, effective gamified training must carefully consider the target audience of the training. Therefore, this emerging results paper investigates the impact of gamification on the engagement, learning, and attitudes of software professionals participating in video-based soft skills training. We conducted an experiment involving 48 software professionals who completed a presentation skills training program. Our findings indicate that gamified video-based training did not significantly improve engagement or learning when compared to a non-gamified training. Nevertheless, participants generally expressed more positive attitudes toward gamified training. Based on these findings, we discuss several design considerations for technology-supported professional development for software professionals.

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1 Introduction

Soft skills are “intra- and inter-personal (socio-emotional) skills essential for social participation and workplace success [15]” and include competencies such as communication skills and the ability to work effectively in teams. Soft skills complement core software development

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activities such as requirement elicitation, design and construction, and quality assurance, but software professionals often lack these skills [15]. Ways to train soft skills include seminars, coaching, and workshops [5]. However, such training is time-consuming and disrupts professionals' schedules, and many software organizations lack the resources for soft skills development [14]. As a result, self-guided e-learning, and in particular video-based training, has emerged for professional soft skills development [18]. Learners can attend the training at their own time, their own pace, and personalize the training [29]. However, video-based training leads to shallow learning if there is little interaction with the video-based content [8]. To mitigate passive learning, "active video watching" (AVW) includes reflective activities, such as commenting on videos and reviewing comments from other learners [8]. This allows learners to engage with the training material, including deciding what is relevant, organizing information, and integrating it with their existing knowledge.

Gamification, i.e., the use of game design elements (e.g., badges, points) in non-game contexts, can further increase engagement with these activities [20]. However, gamification must carefully consider the target audience of the training [10]. Therefore, our goal in this *Emerging Results* paper is to investigate the impact of gamification on video-based soft skills training of software professionals. We address the following research questions (RQs):

1. **Does gamification increase engagement and learning in video-based soft skills training of software professionals?** Prior research has shown that professionals are open to gamified training [28]. However, this does not mean that gamification is actually effective in soft skills training. We analyze the impact of gamification on the engagement and learning of software professionals.
2. **What are the attitudes of software professionals towards gamified video-based soft skills training?** To complement the insights about the *effect* of gamification, we explore the *attitudes* of software professionals toward gamified video-based soft skills training.

2 Background

2.1 Soft Skills

Inadequate soft skills impact software project success and many software companies emphasize soft skills during recruitment [33]. Prior works found that communication is the most prominent soft skill in software engineering, and highlighted that soft skills do not depend on organization size or business domain [19]. Some studies focused on specific software professional roles. For example, de Moraes Leça and de Souza Santos [7] explore soft skills for data scientists in the software industry and found critical thinking and empathy as essential for addressing the ethical challenges in software engineering. Estes et al. [12] conclude that interpersonal and stakeholder communication, as well as written communication skills are essential for software product managers.

For training soft skills, Szilárd et al. [34] suggested e-learning, in-person workshops, roleplay, simulation, mentoring, and coaching. Paulisch et al. [27] recognize the importance of soft skills training for senior software architects and developed a program to train architects while acknowledging the necessary investment in time and resources for a training program. Still, most studies on soft skills training in software engineering cover academic education rather than professional development of software engineers in industry [9].

2.2 Video-based Training

Video-based training via platforms such as Coursera², Udemy³ Harvard Online Learning⁴, LinkedIn Learning⁵ or YouTube tutorials has seen significant growth [29]. By incorporating audio and visual elements, videos offer structured and engaging training content for better understanding and knowledge retention [29]. Learners can pause and revisit content at their own pace [29]. It also removes physical and time barriers for training in a setting and at a time that best suits learners [29]. Video-based training also offers advantages for training providers through scalable delivery to larger audiences while reducing repetitive efforts [29]. However, only passively watching videos results in lower training effectiveness and knowledge retention [28]. *Active video watching* involves engaging in reflective activities: writing comments and reviewing comments from other learners [8] and can support professional training of software engineers in industry [14]. Gamifying such active video-based training can further increase learner engagement.

2.3 Gamification

Gamification is “the process of game-thinking and game mechanics to engage and solve problems [38].” Software developing organizations have started to adopt gamification in employee training [13]. Mahat et al. [24] examined gamified professional training across domains. The authors identified three strategies for gamifying professional training: (1) gamified computer training platforms, (2) face-to-face gamified training, and (3) blended gamified training (i.e., combining computer-supported and face-to-face activities). They also noted that points, levels, leaderboards, challenges, and badges are the most common game elements in professional training. Miller et al. [25] conducted a case study within an IT department. Leaderboards, levels and challenges increased engagement in technology training, and gamification was well received by the employees. Ayoup et al. [2] conducted a case study in a large-scale software development company, implementing a badge-based gamified DevOps training program. Gamification helped accelerate the adoption of DevOps practices and practitioners found badges beneficial for learning.

3 Research Method

In this section, we provide an overview of the research method used to carry out the experimental study. We received approval from our institution’s ethics board. We adhered to the guidelines for conducting experiments in software engineering [36].

3.1 Hypotheses and Variables

We define the following **hypotheses** (for space reasons we do not include the alternative hypotheses). Hypotheses 1 and 2 relate to RQ 1, and Hypothesis 3 relates to RQ 2:

1. Engagement: H_{10} Software professionals who participate in gamified video-based soft skills training will not demonstrate significantly higher levels of engagement compared to those who participate in non-gamified training.

² <https://www.coursera.org/>

³ <https://www.udemy.com/>

⁴ <https://pll.harvard.edu/>

⁵ <https://www.linkedin.com/learning/>

2. Learning: $H2_0$ Software professionals who participate in gamified video-based soft skills training will not demonstrate significantly higher levels of learning compared to those who participate in non-gamified training.
3. Attitudes: $H3_0$ Software professionals who participate in gamified video-based soft skills training will not demonstrate significantly more positive attitudes compared to those who participate in non-gamified training.

The **independent variable** was whether professionals used gamified training or not. We categorize the **dependent variables** according to the constructs we measured in the experiment. Table 2 shows the variables for *engagement* ($H1$).

For *learning* ($H2$) we calculated a Learner Model Score (LMS) which represents the current skill level of a learner. This was because assessing presentation skills using live presentations was impractical due to the large cohorts, time and location constraints. We employed an ontology-based LMS [4]. This approach models each learner’s knowledge based on a structured ontology of Knowledge Components (KCs) related to the trained skill, and updates the KC-level as a score whenever learners interact with course materials. For example, if a learner writes the comment “The audience appreciates the use of diagrams”, the score for KC *Visual Aids* is increased as keyword “diagram” shows awareness of the importance of visualizations in presentations. The resulting scores, normalized between 0 and 1, provide an estimate of knowledge acquisition, which we used as a proxy for learning [4]. The learner model is initialized based on the learner’s answer to the conceptual knowledge questions provided in a pre-survey. During the learning process, each time a learner writes a comment or responds to a peer, the KC score is updated [4]. This update process continues throughout the learning activities, with each KC score capped at a maximum of 1 for full mastery.

For *attitude* ($H3$) the measurement constructs were primarily grounded in the Technology Acceptance Model (TAM) [6]. To better evaluate user attitudes in the context of gamified video-based soft skills training, we extended the TAM measures by incorporating additional constructs from previous studies [11, 37]: (1) Perceived Usefulness for Learning (PU): the extent to which soft skills training and supports learning activities. (2) Perceived Ease of Use (PEU): degree to which training is easy to follow and interact with. (3) Behavioral Intention (BI): intention to use and recommend the training for future training. (4) Task-technology Fit (TTF): extent to which the implementation of training supports learning tasks and meets soft skills training needs. (5) Enjoyment: degree to which the training experience is fun and pleasurable. (6) Negative Affect (NA): the extent to which users experience negative emotions during training. (7) Social Recognition (SR): importance placed on organizational and peer acceptance of the training for professional development. The measures were adapted for both the gamified and non-gamified conditions with minor wording modifications to ensure comparability across conditions. Responses were collected using a 7-point Likert scale ranging from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Cronbach’s alpha was used to assess the internal consistency of the scale items, while composite averages were calculated for each construct to represent respondents’ overall perceptions. Optional free text comments were also allowed alongside each construct, allowing participants to explain the reasoning behind their ratings. The supplementary material provides the complete list of selected constructs and measurement items used in the study.

3.2 Experiment Design

Study Participants. To recruit professionals from industry, we used purposive sampling [3] and recruited professionals through personal contacts and by reaching out to software organizations. We did not constrain recruitment based on factors such as age, qualifications,

or years of professional experience, as long as professionals were employed in the software engineering industry. Participants were randomly assigned to treatment conditions. The design was balanced across the two treatment groups and followed a one-factor (gamification condition), two-treatment structure (control: not gamified; experiment: gamified).

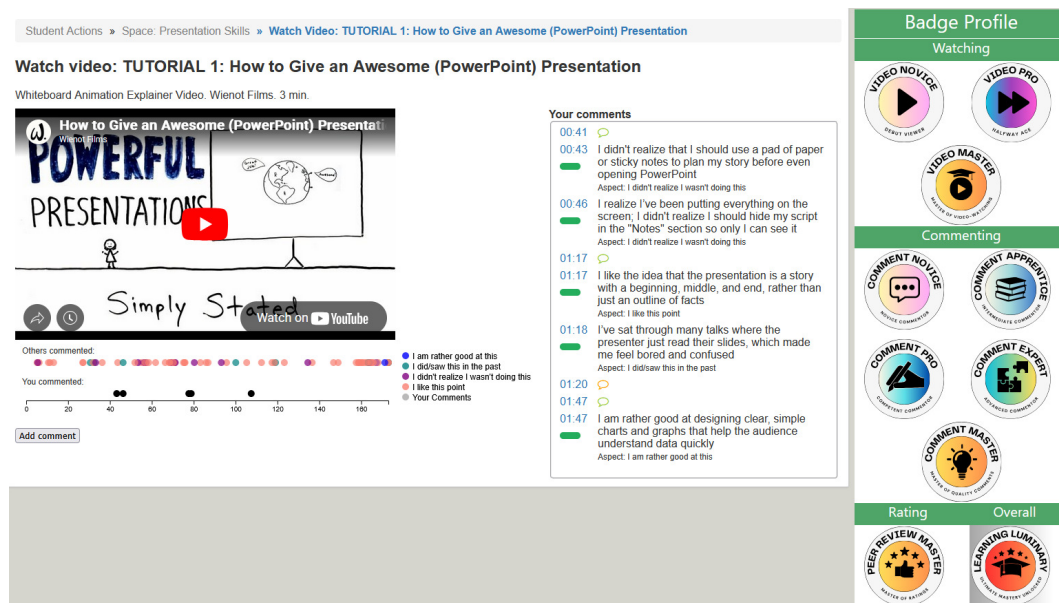
Study Environment. The scope of the experiment was a video-based training exercise to develop presentation skills, one representative communication skill required by software professionals [15]. This context was selected to better reflect how the training would be used in real professional settings. The experiment was conducted within the context of AVW-Space [8], an active video watching platform where we added gamification features in form of badges. The platform contains three generic training activities: watching videos, commenting on videos as a means of reflection for deeper learning, and reviewing comments from other learners on the same videos for another opportunity of reflection and engagement. Learners might be familiar with these activities from platforms like YouTube. The selection of game elements in AVW-Space was informed by prior work involving software professionals [28]. In line with the theoretical findings of this earlier study, we selected badges as the primary game element, as they emphasize individual progress and rewards [28]. We intentionally limited the implementation to a single game element, since the inclusion of multiple game elements may confound experimental results. To ensure that practitioners would respond positively to both the visual design and awarding conditions of the badges, we designed them based on established badge design frameworks [16]. Table 1 presents the badge awarding conditions, while Figure 1 shows the interface used for training. Comment quality to award some of the badges was based on a comment quality assessment framework developed by others [26], which has since been adopted in subsequent studies [4, 23].

■ **Table 1** Badges and awarding conditions for presentation skills.

Badge	Awarding Condition
Video Novice	After watching first video
Video Pro	After watching 4 videos (half the videos in no particular order)
Video Master	After watching all 8 videos
Comment Novice	After writing first high-quality comment
Comment Apprentice	After writing two high-quality comments for the first video
Comment Pro	After writing two high-quality comments for the next video
Comment Expert	After writing three high-quality comments each for the next 3 videos
Comment Master	After writing five high-quality comments each for the next 3 videos
Peer Review Master	After reviewing and rating 15 peer comments
Learning Luminary	After accumulating all other badges

Study Activities. Participants completed a pre-survey that collected demographic information and assessed their conceptual knowledge of presentation skills (see Section 3.1). The professionals then used AVW-Space to complete a learner journey independently, in their own pace, i.e., they watched and commented on eight presentation skill videos. The videos⁶ were selected by experts in software engineering and education technology based on the following criteria: (1) content relevance (for software engineering and presentation skills, e.g., covering structure, delivery and visual aids, or examples of presentations); (2) pedagogical value and

⁶ An example video used in the study can be found at <https://www.youtube.com/watch?v=i68a6M5FFBc>.



■ **Figure 1** Gamified prototype (user interface for watching and commenting on videos).

quality (e.g., delivery of video content); (3) length (no longer than 10 minutes to avoid fatigue); (4) gender balance in videos; (5) diversity of content (e.g., popular and not so popular examples based on YouTube ratings) [8], see supplementary material. Participants were also given access in AVW-Space to a set of pre-selected, anonymously published comments from a previous study involving a different group of software professionals (we could not use comments from the same participant group because participants went in their own pace and completed the learning activities at different times over a two-month period). Participants reviewed the anonymously published peer comments. Finally, participants completed a post-survey that captured their attitudes toward the use of gamified video-based training for professional development. The variables used to measure engagement and learning for $H1$ and $H2$ are automatically collected in AVW-Space. Attitudes ($H3$) were captured via a post-survey. The participants, from their point of view, did not primarily participate in an experiment; they were taking a soft skill training program. We offered a 17 US\$ gift voucher in appreciation of their consent to the use of their data.

4 Results

The sample consisted of 27 software professionals who followed the gamified training and 21 who followed the non-gamified training, with the following demographics:

■ Age

- Gamified group: 24–29 ($n = 13$), 30–35 ($n = 14$)
- Non-gamified group: 18–23 ($n = 1$), 24–29 ($n = 16$), 30–35 ($n = 3$), 36–41 ($n = 1$)

■ Gender

- Gamified group: Male ($n = 17$), Female ($n = 10$)
- Non-gamified group: Male ($n = 16$), Female ($n = 5$)

■ Country

- Gamified group: Philippines ($n = 13$), Sri Lanka ($n = 7$), Malta ($n = 2$), Finland ($n = 1$), Germany ($n = 1$), Japan ($n = 1$), Malaysia ($n = 1$), New Zealand ($n = 1$)

- Non-gamified group: Philippines ($n = 17$), Sri Lanka ($n = 1$), Singapore ($n = 1$), United Kingdom ($n = 1$), United States of America ($n = 1$)
- **Highest degree**
 - Gamified group: Bachelor's ($n = 26$), Master's ($n = 1$)
 - Non-gamified group: High School ($n = 1$), Bachelor's ($n = 20$)
- **Seniority**⁷
 - Gamified group: Junior (1–2 years, $n = 8$), Intermediate (3–5 years, $n = 14$), Senior (> 5 years, $n = 5$)
 - Non-gamified group: Junior (1–2 years, $n = 8$), Intermediate (3–5 years, $n = 5$), Senior (> 5 years, $n = 8$)

4.1 Engagement

Engagement data were not normally distributed (Shapiro-Wilk test), so we employed the Mann-Whitney U test to compare the gamified and non-gamified groups. However, we did not find any significant differences in the engagement metrics between the gamified training and the training without gamification (see Table 2). Effect sizes (rank-biserial correlation) for all engagement variables were small, and their 95% confidence intervals included zero, confirming that engagement did not differ significantly between the gamified and non-gamified groups. Therefore, the null hypothesis (H_{10}), which states that there is no significant difference in engagement between gamified and non-gamified video-based training was not rejected. Software professionals who used gamified training did not exhibit higher engagement than those in non-gamified training.

4.2 Learning

We refer to the learner model score at the start of the experiment as LMS_{Start} , the learner model score at the end of the experiment as LMS_{End} and the difference between LMS_{Start} and LMS_{End} as LMS_{Diff} . We used the Mann-Whitney U test and the independent sample t-test since LMS_{Start} was not normally distributed (Shapiro-Wilk test). Despite differences in the distribution of age, country, education, and seniority, we found that both the gamified and non-gamified groups started with similar LMS_{Start} . However, we did not find any significant differences in LMS_{End} or LMS_{Diff} between the gamified and non-gamified groups (see Table 3). Learning outcomes did not differ significantly between groups, with small-to-moderate effect sizes (Cohen's d and rank-biserial correlation) and confidence intervals spanning zero. Therefore, the null hypothesis (H_{20}), which states that there is no significant difference in learning outcomes between gamified and non-gamified video-based training among software professionals, was not rejected. Software professionals in gamified training did not exhibit higher learning than those in non-gamified training.

4.3 Attitudes Towards Gamified Video-based Training

Table 4 presents the reliability analysis along with the means and standard deviations of the constructs for the gamified group and non-gamified group. Since all constructs yielded Cronbach's alpha greater than 0.70, the instrument can be considered reliable [31]. The mean represents the average response over all professionals in a group, while the standard deviation indicates the degree of dispersion around the mean.

⁷ Seniority is based on [22]

■ **Table 2** Engagement variables.

	Gamified (N=27)		Non-gamified (N=21)		Significance	Effect size	95% CI
	Mean (sd)	Median	Mean (sd)	Median			
Days logged into training	3.30 (2.20)	3	3.57 (2.80)	3	$U = 270.5, p = .784$	$r = -0.0459$	$-0.3598, 0.2787$
# training sessions	4.74 (3.98)	4	4.86 (3.55)	4	$U = 255.5, p = .557$	$r = -0.0988$	$-0.4110, 0.2311$
# videos watched	6.67 (2.47)	8	7.67 (1.53)	8	$U = 226.0, p = .066$	$r = -0.2028$	$-0.4074, -0.0123$
# comments posted	18.07 (15.43)	15	20.57 (14.52)	15	$U = 248.0, p = .460$	$r = -0.1252$	$-0.4427, 0.2081$
# high quality comments	13.19 (11.72)	11	15.62 (12.60)	12	$U = 252.5, p = .519$	$r = -0.1093$	$-0.4392, 0.2275$
# comments reviewed	25.63 (33.49)	15	47.38 (50.48)	30	$U = 197.5, p = .074$	$r = -0.3034$	$-0.6085, 0.0159$

) *Note.* r = rank-biserial correlation; 95% CI reported as lower limit, upper limit.

■ **Table 3** Learner Model Scores.

	Gamified (N=27)		Non-gamified (N=21)		Significance	Effect size	95% CI
	Mean (sd)	Median	Mean (sd)	Median			
LMS_{Start}	0.003 (0.003)	0.003	0.003 (0.002)	0.003	$U = 260.5, p = .633$	$r = 0.0811$	$-0.2646, 0.4109$
LMS_{End}	0.100 (0.069)	0.092	0.120 (0.067)	0.122	$t = 0.99, p = .326$	$d = 0.289$	$-0.2860, 0.8610$
LMS_{Diff}	0.097 (0.068)	0.090	0.117 (0.067)	0.119	$t = 1.03, p = .309$	$d = 0.300$	$-0.2760, 0.8710$

) *Note.* r = rank-biserial correlation; d = Cohen's d ; 95% CI reported as lower limit, upper limit.

Practitioners in both groups expressed a positive attitude towards video-based soft skills training (see Table 4). Although gamified training showed a slightly higher overall mean (6.09 [$SD = 0.6040$]), no statistically significant differences were observed between the two groups. Therefore, the null hypothesis (H_{30}), which states that there is no significant difference in attitudes between gamified and non-gamified video-based training programs among software professionals, was not rejected. Software professionals following the gamified training did not demonstrate more positive attitudes than those following the non-gamified training.

■ **Table 4** Measurement constructs for gamified group | non-gamified group.

Construct	Cronbach's Alpha	Mean	Std. Deviation
PU	0.866 0.939	6.02 6.25	0.7131 0.9605
PEU	0.854 0.928	6.27 6.02	0.5884 1.2306
BI	0.930 0.974	6.28 5.90	0.7819 1.3250
TTF	0.892 0.878	6.00 5.95	0.8918 1.0990
Enjoyment	0.923 0.949	6.07 5.60	0.8033 1.6063
NA	0.895 0.958	5.71 5.88	1.1450 1.6394
SR	0.871 0.840	6.25 5.78	0.6387 1.0321
Overall acceptance	—	6.09 5.91	0.6040 1.0168

On the other hand, although the individual mean values across the gamified and non-gamified groups appear relatively similar, most constructs, including BI, PEU, and SR showed higher mean scores in the gamified group. This suggests a slight trend towards a positive difference, although the differences were not statistically significant.

5 Discussion

5.1 Implications of Findings

Our training solution was designed in line with established practices for professional development [27, 17]. It focuses on individual learning progress, incorporates active learning using self-reflective activities, and supports flexible, self-paced engagement. In addition, in the post-survey, participants in the gamified group generally reported positive attitudes toward badges in terms of how badges improve performance and the ease of use of badges with mean scores of 5.79 and 6.23 out of 7, suggesting that the game elements themselves were not perceived negatively. However, the experiment did not show a significant increase in engagement or learning for professionals who followed the gamified training. Although we observed a generally high overall acceptance of gamified video-based training for soft skills, there was also no significant difference between the gamified and non-gamified video-based training. Similar findings have also been reported for other types of learners, e.g., for students where gamification had less impact on engagement and learning [35]. On the other hand, the study also did not identify any significant detrimental effects of gamification. Several factors may explain the absence of a positive effect. One plausible explanation relates to the perceived relevance of the targeted soft skills. Software professionals may not view presentation skills as a critical soft skill that requires training, since they practice written and verbal communication on a daily basis anyway. This could have reduced their motivation to engage with the training regardless of whether it is gamified. Another possible explanation may be a general skepticism among software professionals regarding gamification for training. This skepticism was also evident in previous work [28], where software engineering

professionals were more doubtful than students that gamification could enhance learning. Practical constraints may have further limited engagement of software professionals. Since professionals have busy schedules, they may have felt less motivated to engage in this soft skill development. Furthermore, their work commitments may have caused interruptions, which might be a general challenge of professional development in the software industry [32]. Therefore, integrating additional incentives or support from organizations may be necessary to enhance engagement and learning among software professionals. For example, linking professional development to career progression, integrating it more directly into daily workflows, and associating rewards with formal recognition may improve both engagement and learning outcomes. This aligns with prior research in other domains, which highlights the importance of time constraints, employer support and motivation in professional development [1]. Finally, it should be noted that our sample was relatively broad in terms of professional seniority, and given its size, we could not detect any differences in outcomes based on seniority level.

With regard to the perceptions of software professionals on the use of gamified video-based training, the results indicated no statistically significant difference between the gamified and non-gamified video-based training. However, constructs such as PEU, BI, Enjoyment, and SR showed higher mean scores for the gamified group compared to the non-gamified group. This suggests that the gamified training may encourage more positive behavioural tendencies among software professionals toward training of soft skills. The higher scores for BI indicate a greater willingness to engage with and adopt the training (as one participant stated in the optional free text comments, “The rewards and challenges encourage consistent practice”). Additionally, the higher level of SR suggests that participants perceive that their peers and managers are likely to accept and support this type of training approach (e.g., one participant stated that “They likely appreciate that it offers measurable progress and helps employees improve in a flexible, self-paced way”). The higher PEU scores further indicates that the gamification did not create additional complexity or interruptions. Instead, gamification appears to function as a seamless enhancement to the training. The higher Enjoyment scores mean that professionals actually enjoyed the gamified training (e.g., one participant commented that “The badges and progress tracking made the experience enjoyable by giving a sense of achievement”), which was one of the key motivational factors we found in previous studies [28].

5.2 Future Work

- **Further empirical research:** Future research should conduct additional studies with larger software professional groups to improve the generalizability of the results and to further examine the effectiveness of gamification. Larger-scale experiments may reveal behavioural or motivational effects that were not observable in the present study. Additionally, future studies should explore the intervention in a wider range of contexts to better understand the conditions under which gamification is most effective. For example, experiments could provide insights into whether certain workplace settings offer a more suitable context for gamified video-based professional development.
- **Refinement of the gamification intervention:** Future work could also focus on refining the gamification used in this experiment. In particular, improvements to badges may further enhance their motivational impact on software professionals. One potential direction is the integration of social gamification elements, such as peer visibility of badges or comparative progress indicators. Incorporating these social aspects into the existing badge implementation may strengthen engagement and provide additional motivational mechanisms beyond individual achievement. Additionally, future studies could explore other game elements, or combinations of multiple game elements rather than a single element, building on the recommendations provided by previous work [28].

5.3 Threats to validity

- **Construct validity:** Engagement was calculated using interaction metrics from the training platform. However, these behavioral indicators may not fully represent participants' cognitive or emotional engagement with the learning material, as learners may interact with the platform without being deeply engaged with the content. Similarly, learning was calculated using the LMS [4] as a proxy for the acquisition of soft skills. While this metric provides a structured quantitative measure of learner knowledge gain, it may not fully capture the multidimensional nature of soft skills competency, which often includes behavioral, interpersonal, and contextual elements that extend beyond what can be measured through system interactions alone.
- **Internal validity:** Differences in participants' baseline motivation and external workload demands may introduce a confounding variable that affects engagement independently of the gamified training. As a result, variations in participation in optional training activities may reflect pre-existing motivational differences or time constraints rather than the effect of the treatment itself. For example, the non-gamified group watched, on average, more videos and, on average, reviewed more comments. One possible explanation could be that professionals in the non-gamified group, who may have already had a high intrinsic motivation, continued engaging with videos and peer comments based on self-directed learning needs [21]. In contrast, gamified elements in the gamified group may have introduced explicit completion markers [30] (e.g., peer review master for reviewing 15 peer comments), which could have signaled task completion once acquired. This means that studies need to carefully control for the motivation and individual training needs of participants.
- **Conclusion validity:** One potential threat relates to the variability within the professional participant group, which included individuals from multiple countries and potentially diverse professional backgrounds. Such heterogeneity can increase variance in the data and reduce the ability to detect statistically significant effects. Another concern is the small sample size which may reduce statistical power and increase the likelihood of failing to detect meaningful effects of gamification.
- **External validity:** Our experiment focused specifically on video-based training for soft skill development and utilized a gamified implementation of a specific learning platform, AVW-Space. Although the platform incorporates common video-based learning activities, the design of the platform beyond the gamification features may influence how learners interact with the content. As a result, the findings may not generalize to other types of training platforms. Finally, our experiment examined only one of the soft skills, i.e., presentation skills as a representative communication skill. Therefore, the results may not necessarily generalize to other soft skills that may require different forms of training or assessment.

6 Conclusion

In this paper, we (1) explored the effectiveness of gamification in enhancing engagement, (2) examined its impact on learning, and (3) investigated the attitudes of software professionals toward gamified video-based training for soft skills development. Unlike Peiris et al. [28] which compared the perceptions and attitudes of different types of learners toward gamification, our study investigates the impact of gamification within one group of learners who actually experienced the gamified intervention.

The findings indicate that gamification did not lead to a statistically significant improvement in engagement or learning among professionals. Similarly, professionals in both the gamified and non-gamified groups reported generally positive attitudes toward video-based training for soft skills development across multiple measures, with no significant difference between the two groups. Given the relatively small sample size, these findings should be interpreted with caution and as preliminary, as the study may not have had sufficient statistical power to detect potential effects. Future research with larger professional samples is therefore needed to more conclusively determine the impact of gamification.

Data Availability Statement

The dataset supporting this study, including study details and raw data, is openly available on Zenodo at <https://doi.org/10.5281/zenodo.20424284> under a CC-BY 4.0 license. The replication package contains all materials necessary to reproduce our findings.

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