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MAPPING GAMIFICATION THREATS ACCORDING TO GENERATION Z – PILOT STUDY

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Purpose: The paper examines how members of Generation Z perceive gamification-related threats, with particular attention to the perceived severity and likelihood of negative consequences. It also seeks to identify preliminary patterns linking risk perception with respondents' knowledge of and beliefs about gamification.
Design: The article combines a literature review with a quantitative exploratory pilot survey. Based on the literature, the authors developed an original questionnaire including 23 statements concerning perceptions of gamification and 19 potential threats assessed on a 5-point Likert scale in terms of severity and likelihood of occurrence. Data were collected via Google Forms from 50 Generation Z respondents with prior exposure to gamified activities. The analysis employed descriptive statistics, correlation analysis, reliability analysis, hierarchical cluster analysis, and ANOVA using SPSS and RStudio.
Findings: The results show that respondents generally perceive gamification as important for motivation and engagement, but do not consider its design and implementation easy. The most serious threat identified was unhealthy competition, whereas the most likely threats were excessive focus on game results, reward dependence, and declining motivation after the novelty effect had worn off. Perceived severity and perceived frequency of threats were moderately and significantly correlated. Three preliminary respondent profiles emerged: gamification enthusiasts, cautious realists, and gamification skeptics. The key factor differentiating these groups was awareness of the importance of proper gamification design, planning, and implementation.
Research limitations: The study is limited by its small, non-representative sample and exploratory nature. The authors recommend future research on larger and more diverse samples using confirmatory designs.
Practical implications: The findings suggest that gamification should be treated as a carefully designed process rather than as a simple motivational tool. In HR and education, designers should balance motivational benefits against risks such as unhealthy competition, stress, and overreliance on rewards.
Value: The paper contributes by mapping how Generation Z perceives gamification-related threats and by proposing preliminary attitude profiles that may be useful for further research and practice. It is addressed to researchers, educators, and managers using gamification.
Keywords: gamification, risk perception, Generation Z, motivation, cluster analysis.
Category of the paper: Research paper.

1. Introduction

For nearly two decades, both developing and developed societies have experienced increasing digitalization in work, education, and private life. A growing share of everyday activities is moving online or at least becoming partly dependent on virtual environments. One of the most important contemporary tools used to motivate people, influence employee engagement, and create enjoyment is gamification. Educational and organizational environments increasingly implement game-like mechanisms such as points, rankings, badges, challenges, and levels. These elements can make activities more attractive, especially when they are perceived as routine, trivial, overly difficult, or demanding. However, the growing use of gamification also calls for critical reflection on its effects, which may be both positive and negative.

The literature most often emphasizes the positive effects of gamification, especially its effectiveness in enhancing user motivation, engagement, and interest (Toda et al., 2017). However, insufficient attention has been paid to the risks associated with exposing people—especially young people—to long-term interaction with gamified systems. Recently, growing interest has emerged in studies highlighting the negative aspects of gamification, including unhealthy competition, loss of intrinsic motivation and pleasure in the activity itself, stress and pressure caused by social comparison, excessive focus on points, achievements, and metrics, as well as ethical risks related to user addiction and manipulation (Toda et al., 2017; Hadi Mogavi et al., 2022; Kačerauskas et al., 2023). It is therefore important to ask not only whether gamification works, but also at what cost, for whom, and under what conditions it may lead to negative consequences. Ultimately, it is equally important to ask whether users of gamified solutions are aware of the risks involved.

In this context, the perspective of Generation Z—a group deeply immersed in the digital environment—is particularly important. Members of this cohort constitute one of the main target groups for gamified solutions. On the one hand, this may contribute to their high acceptance of such mechanisms; on the other hand, it does not necessarily imply risk awareness or an accurate assessment of the potential negative consequences of gamification. This creates a need for empirical identification of which gamification-related threats are regarded by Generation Z respondents as the most serious, which are considered the most likely, and why. It should be emphasized, however, that this identification is preliminary and limited to the sample analyzed in this study.

The purpose of this article is to examine how Generation Z perceives threats related to gamification. This is a pilot, exploratory study, and the collected data and subsequent analyses are intended to serve as a basis for developing hypotheses concerning the relationship between Generation Z's assessments of the severity and likelihood of gamification-related threats and other variables that may influence these perceptions. The theoretical section provides a concise

overview of the nature of gamification and presents the key threats identified in the literature. These issues are then related to the specific characteristics of Generation Z. The empirical section presents the results of a questionnaire survey in which respondents assessed threats along two dimensions: severity and likelihood of occurrence. Using a pilot sample, the study examined whether higher perceived severity of gamification threats was associated with higher perceived likelihood and whether there were grounds for formulating hypotheses about how knowledge of and beliefs about gamification influence perceived threat severity and frequency. The proposed approach allows for a preliminary identification not only of the perceived hierarchy of risks, but also of potential relationships between threat-severity assessments and perceptions of their actual frequency. These relationships should be statistically verified in future studies using representative samples. Data on threat perception were compared with respondents' knowledge of and beliefs about gamification, allowing for a preliminary exploration of patterns among individuals who attribute relatively high or low levels of risk and probability to various negative effects of gamification.

2. Generation Z in the context of gamification

Generation Z's strengths include high digital competence, the ability to adapt quickly to new technologies, innovativeness, and the willingness to work in diverse and international teams. At the same time, the literature points to a number of problem areas, such as short attention spans, a tendency toward superficial information processing, deficits in direct interpersonal communication, difficulty coping with routine, and an increased risk of mental health problems (Nowicka, 2020; Jayatissa, 2023). In the organizational context, this means that management tools targeted at this group should both leverage their digital and creative potential and compensate for weaker areas of functioning, particularly concentration, perseverance, and interpersonal relations.

In this context, gamification is particularly relevant because it can address a range of psychological and educational needs associated with Generation Z. These characteristics suggest that gamification mechanisms are well suited to this generation's expectations. They provide immediate feedback, are visual and interactive, and support a sense of agency and autonomy. Point systems, badges, rankings, and other forms of rapid feedback may respond to preferences for ongoing performance evaluation, while interactive scenarios and visual elements may increase cognitive engagement among individuals who prefer diverse learning styles and dislike routine (Dicheva et al., 2015; Huang, Soman, 2013). Furthermore, well-designed gamification systems can enable users to choose action paths and make decisions, which is consistent with the need for self-direction emphasized in relation to Generation Z. Given this generation's high level of digital competence, gamification

mechanisms may also be perceived as intuitive and natural, and therefore may be more readily accepted than traditional forms of communication.

3. Risks associated with the use of gamification – literature analysis

The literature on gamification is dominated by studies examining its benefits. However, a growing body of research also addresses its negative consequences. These risks may create serious problems not only for the individual participating in a gamified activity, but also for the wider social group involved, the immediate environment of the user, and the project that gamification was originally intended to support (Almeida et al., 2021; Toda et al., 2017).

One of the most frequently described threats is an excessive focus on results. People engaged in gamified systems may prioritize scores, rankings, or points over the actual quality of their work, which may reduce diligence and conscientiousness. Moreover, the rewards—both tangible and intangible—that can be obtained through the system may become more important than the gamified activity itself and the quality of the tasks performed (Toda et al., 2017; Hadi Mogavi et al., 2022).

An excessive focus on results and immediate gratification may also lead to the simplification and superficialization of learning processes, encouraging users to treat points, badges, or leaderboard positions as ends in themselves rather than as indicators of competence development, project progress, or valuable experience (Haaranen et al., 2014). In the literature, this phenomenon is often referred to as “shallow gamification” and denotes the dominance of simplified implementations based on the so-called PBL logic (points, badges, leaderboards), which reinforce behaviors that are easily measurable but not necessarily the most valuable (Dah et al., 2025). Toda et al. (2017) identify reduced depth of learning as one of the key negative effects of gamification in education, while Hadi Mogavi et al. (2022) describe numerous cases of simplified learning and behaviors focused on “system satisfaction” rather than on the actual educational goal. These threats are particularly relevant in the context of Generation Z, whose members are both success-oriented and highly responsive to immediate feedback and rapid gratification such as badges or points (Dolot, 2018).

Another important category of risk concerns the impermanence of gamification effects and the frequent decline in motivation once the novelty wears off. The literature often emphasizes that positive effects of gamification, such as increased engagement, tend to be strongest during the early stages of implementation and are often not sustained over time (Toda et al., 2017; Kačerauskas et al., 2023). Hammedi et al. (2021) show that increases in engagement may be short-lived and may weaken after the end of an intense competitive phase, while Toda et al. (2017) identify decreasing effects as one of the most frequently recurring categories in analyses of the negative effects of gamification.

Another widely discussed group of threats includes unhealthy competition and additional stress. Studies often indicate that social comparison is one of the most common sources of stress in gamified activities. Hadi Mogavi et al. (2022) report frequent references to the negative impact of gamification on well-being, and Yang and Li (2021) demonstrate that competitive mechanisms can be significant predictors of technostress and exhaustion. This suggests that although competition may motivate some individuals, it also has the potential to undermine users' well-being. The consequences of social comparison may be particularly important for Generation Z, whose members are often described as reluctant to compete and as valuing autonomy and the possibility of progressing at their own pace, without constant comparison to others (Nowicka, 2020).

Particularly important threats in the context of Generation Z also include addiction to games, rewards, or gamified work, where addiction is understood here as a problematic, compulsive pattern of use (e.g., obsessive maintenance of streaks, excessive attachment to rewards, or difficulty interrupting the activity). Srivastava et al. (2023) show that addiction to gamification elements is one of the strongest predictors of poorer mental well-being, and Hadi Mogavi et al. (2022) describe phenomena resembling an "obsession with streaks", that is, with maintaining days or periods of uninterrupted participation in an activity.

Among the less frequently mentioned but still significant risks associated with gamification is so-called forced play, which manifests itself in a sense of obligation to participate in the game, even though play is by definition voluntary. It may also involve a loss of intrinsic motivation, often replaced by external motivators, and a decline in experienced pleasure and satisfaction derived from the activity (Mollick, Rothbard, 2014; Hanus, Fox, 2015).

A separate but equally important category comprises design flaws, including inappropriate game mechanics, poorly designed rules, and systems that hinder rather than support the achievement of actual educational or organizational goals. Research and implementation literature emphasizes that many undesirable effects of gamification stem not from the very idea of using game elements, but from simplistic design, a lack of grounding in motivational theory, and poor adaptation to users and context. This group of problems also includes unclear or overly complex rules, which may discourage participation (Hanus, Fox, 2015; Almeida et al., 2021).

Ethical issues related to the use of gamification to influence users are also receiving increasing attention in the literature. Kim and Werbach (2016) argue that gamification can cross the line between motivation and manipulation when mechanics are designed around hidden influence, information asymmetry, or the exploitation of users' cognitive vulnerabilities. Similarly, Hadi Mogavi et al. (2022), in their qualitative research, cite specific cases in which users experienced a loss of control over their own behavior while participating in a gamified activity.

Another important group of threats concerns data security and privacy, as digital gamification often relies on activity tracking, progress profiling, and the collection of behavioral data (Algashami et al., 2019; Yang, Li, 2021; Srivastava et al., 2023). Yang and Li

(2021) identify privacy violations as a significant stressor in technological environments, and Srivastava et al. (2023) classify them as an important predictor of reduced well-being. In practice, this means that even if users do not spontaneously identify data security as a primary concern in gamified experiences, the literature consistently treats this area as one of the fundamental dimensions of risk.

The literature also regularly addresses inequalities resulting from unequal access to technology and differences in digital skills, which may affect not only outcomes, but also participants' well-being during gamified experiences. Algashami et al. (2019) indicate that differences in digital proficiency can generate frustration and reduce implementation effectiveness. They emphasize that this problem is particularly visible in age-diverse environments, where technological proficiency provides an additional advantage. Moreover, a systematic literature mapping by Almeida et al. (2021) confirms that individuals lacking digital skills may feel excluded from such activities, which—as Kačerauskas et al. (2023) warn—may permanently reduce satisfaction and self-esteem. This threat appears particularly relevant to Generation Z, a cohort often described as sensitive to equality of opportunity and accessibility. At the same time, it should be noted that in contemporary Polish society, where the present study was conducted, differences in access to technology and opportunities to develop digital skills may be less pronounced than in other contexts.

In summary, the literature consistently points to the multidimensional nature of gamification-related threats: from distortions of goal orientation and declining sustainability of effects, through stress and loss of control, to design flaws, manipulation, privacy concerns, and unequal access to technology. Generation Z's awareness of these threats, their potential consequences, and their likelihood of occurrence may therefore be selective, uneven, and context-dependent. This study aims to empirically examine how Generation Z perceives these threats. Its results may contribute to a better understanding of how young people think about functioning in gamified systems and how strongly they fear particular negative consequences.

4. Methodology

As part of the literature review, a list of 23 characteristics describing perceptions of gamification and a set of 19 threats that may occur in gamification-based processes were compiled. Based on these, the authors developed an original questionnaire in which participants responded on a 5-point Likert scale. Respondents:

- described their perceptions of gamification using 23 statements,
- assessed the severity of 19 gamification-related threats, including:
  - gaming addiction,
  - addiction to gamified work,
  - reward addiction,
  - decline in motivation after the initial fascination with the game,
  - replacement of intrinsic motivation (e.g., enjoyment of performing tasks, sense of fulfillment) with extrinsic motivation (rewards received in the game),
  - prioritizing rewards obtained in the game over the value of the work performed,
  - unhealthy competition between co-workers,
  - manipulation of participants through game mechanics,
  - inequalities resulting from unequal access to technology,
  - feeling compelled to perform the activity,
  - decrease in job satisfaction,
  - excessive focus on game results instead of work,
  - incorrectly selected mechanisms causing user dissatisfaction,
  - poorly planned gamification that hinders goal attainment in practice,
  - overly complicated game rules discouraging participants,
  - threats related to the security of shared data,
  - rapid disappearance of effects,
  - excessive focus on numbers and metrics,
  - additional stress caused by competition,
- and assessed the likelihood of these threats occurring.

Data were collected via Google Forms. The analysis combined descriptive and inferential statistical techniques and was conducted using RStudio and SPSS 30.

The study included 50 individuals (18 men and 31 women, with one participant not reporting gender). Twenty respondents were bachelor's students and 30 were master's students. The study was conducted within a single organization whose members had previously participated in gamification-based activities, which made it possible to include only respondents with at least a basic familiarity with the phenomenon under investigation.

Results

The first stage of the analysis concerned perceptions of gamification (Table 1). The table presents only the highest- and lowest-rated items.

Table 1.
Perceptions of gamification

	Mean	Mod	St. Dev.	Min	Max	Percentiles		
						25	50	75
The impact of gamification depends on the individual characteristics of the people participating in it.	4.74	5	,487	3	5	4.75	5.00	5.00
Gamification influences engagement.	4.60	5	,571	3	5	4.00	5.00	5.00
The effectiveness of gamification depends on its implementation.	4.56	5	,541	3	5	4.00	5.00	5.00
Gamification influences the level of motivation.	4.54	5	,613	3	5	4.00	5.00	5.00
Gamification requires a specialized platform or system.	2.58	2	1,162	1	5	2.00	2.50	4.00
Implementing gamification is easy.	2.08	2	,752	1	4	2.00	2.00	2.25
Designing gamification is easy.	1.92	2	,665	1	4	1.75	2.00	2.00
a. There are multiple modal values. The smallest value is given								

Source: authors' own study.

The results indicate that, in this sample, respondents strongly agreed that the effectiveness of gamification depends on participant characteristics (M = 4.74), that gamification affects engagement (M = 4.60), and that its effectiveness depends on implementation quality (M = 4.56). The lowest scores were assigned to the statements that gamification requires a specialized platform (M = 2.58) and that its implementation and design are easy (M = 2.08 and M = 1.92, respectively). Analyses of perceived threats and their likelihood of occurrence are presented in Tables 2 and 3.

Table 2.
Assessment of gamification threats

	Mean	Mod	St. Dev.	Percentiles		
				25	50	75
Unhealthy competition between co-workers.	4.22	5	,996	4.00	4.50	5.00
Putting the value of the reward in the game above the value of the work being done.	4.02	4	,869	3.75	4.00	5.00
Gaming addiction.	2.90	3	1,074	2.00	3.00	4.00

Source: authors' own study.

The two highest-rated threats were unhealthy competition (M = 4.22) and prioritizing gaming over work (M = 4.02). These were the only threats that, according to the respondents, exceeded an average score of 4. The lowest-rated threat was gaming addiction (M = 2.90). The likelihood of threats occurring was assessed similarly (Table 3).

Table 3.
Assessment of the likelihood of threat occurrence

	Mean	Mod	St. Dev.	Percentiles		
				25	50	75
Excessive focus on game results instead of work	3.88	4	,918	3.00	4.00	5.00
Reward addiction	3.84	3	,934	3.00	4.00	5.00
Loss of motivation after the initial fascination with the game	3.84	4	,866	3.00	4.00	4.25
Putting the value of the reward in the game above the value of the work being done	3.84	4	,934	3.00	4.00	4.25
Unhealthy competition between co-workers	3.82	4	1,044	3.00	4.00	5.00
Gaming addiction	2.78	3	1,183	2.00	3.00	4.00

Cont. table 3.

Inequalities resulting from unequal access to technology	2.60	2	1.125	2.00	2.50	3.00
Threats related to the security of shared data	2.42	2	1,108	2.00	2.00	3.00
a. There are multiple modal values. The smallest value is given						

Source: authors' own study.

The threats considered most likely were excessive focus on game results instead of work (M = 3.88), reward dependence (M = 3.84), and a decline in motivation after the initial fascination stage (M = 3.84). The lowest perceived likelihood of occurrence concerned data security threats (M = 2.42), inequalities resulting from unequal access to technology (M = 2.60), and gaming addiction (M = 2.78). Thus, the threats rated as most likely were seen as relatively probable, whereas the lowest-rated threats were perceived as comparatively unlikely.

In the next step, unsupervised statistical learning methods were used to identify groups representing preliminary profiles of Generation Z respondents characterized by different levels of concern about similar negative consequences of gamification. First, following methodological recommendations in the literature, two aggregate variables were calculated for each participant on the basis of all responses (Hair et al., 2019). The results are presented in Table 4. This approach is further supported by the reliability analysis of both scales measured using Cronbach's alpha. The first aggregate variable was labeled "perceived severity of negative consequences of gamification" ($\alpha = 0.892$), while the second was labeled "perceived frequency of negative consequences of gamification" ($\alpha = 0.908$).

Table 4.
Descriptive statistics and correlations for aggregate variables measuring the perceived severity and frequency of negative consequences of gamification

Synthetic variable	Mean	SD	First quartile	Median	Third quartile	Pearson correlation (p-value)	Spearman correlation (p-value)
Perceived severity of negative effects of gamification	3.6	0.61	3.28	3.66	3.97	0.7 (≈0)	0.65 (≈0)
Perceived frequency of negative effects of gamification	3.35	0.63	2.95	3.39	3.68		

Source: authors' own study.

The aggregate variables representing the perceived severity of gamification-related threats and the perceived frequency of their occurrence were correlated in the study sample. Pearson and Spearman correlation coefficients both indicated a moderately strong and statistically significant relationship between the variables. This suggests that respondents who perceived gamification-related threats as more serious also tended to judge them as more likely to occur. Conversely, threats perceived as less severe were also regarded as less likely. The relationship between perceived severity and perceived likelihood is discussed further in the Discussion section.

Cluster analysis

To determine whether the analyzed sample contained distinct and internally coherent groups of respondents characterized by similar patterns of risk perception related to gamification, exploratory hierarchical cluster analysis was used. The analysis employed Euclidean distance as a measure of similarity between observations and Ward's method for forming clusters. This approach is commonly recommended for continuous or quasi-interval data because Ward's algorithm minimizes increases in within-cluster variance at successive stages of clustering (Ward, 1963).

In the methodological literature, variables measured on a Likert scale are often treated as approximations of interval-level measurement, especially when the scale has at least five categories and all variables are measured using the same response format (Norman, 2010; Boone, Boone, 2012). Under this assumption, the use of Euclidean distance in the exploratory analysis of survey data may be regarded as methodologically justified.

Ward's method was selected because of its ability to produce relatively homogeneous clusters of similar size by minimizing the sum of squared within-cluster deviations at each stage of combining observations (Ward, 1963). This method is widely used in social research based on survey data, including studies involving variables measured on Likert scales.

In the initial phase of the analysis, solutions with different numbers of clusters were compared, and dendrograms were examined in order to select the most appropriate number of clusters for interpretation. The literature suggests that the choice of cluster solution should be guided not only by decision-support statistics, but also by visual inspection of the dendrogram, the interpretability of the resulting groups, and sample size.

Accordingly, taking into account the sample size, the variables included, and the visual assessment of the dendrogram, the authors decided to adopt a three-cluster solution. This decision was justified both by interpretability and by the so-called elbow criterion, the values of which were examined for different numbers of clusters. In Figure 1, observations assigned to particular clusters are marked with colors. The graphical presentation of observations in terms of the aggregate variables and cluster membership illustrates the potential relationship between perceived severity and perceived frequency of gamification-related threats described in the previous section.

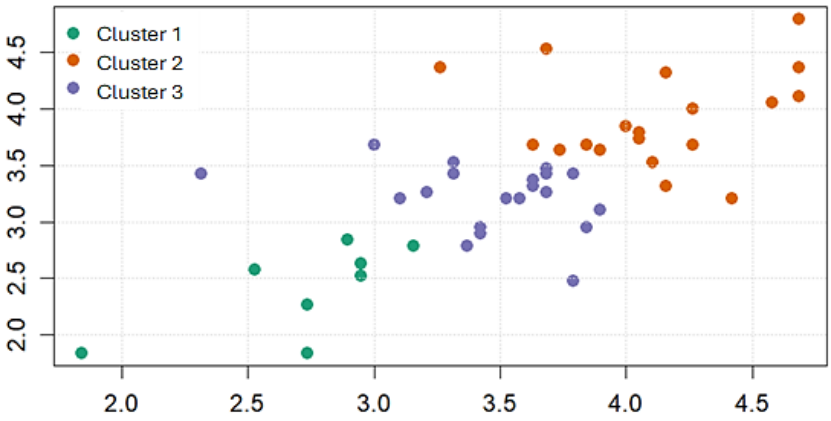


Figure 1. Relationship between perceived severity (X-axis), perceived frequency of threats (Y-axis), and cluster membership.

Source: authors' own study.

The first cluster may be described as gamification enthusiasts. These respondents most often indicated that individual gamification-related threats were not particularly serious and assigned them a relatively low likelihood of occurrence. The second cluster may be described as gamification skeptics. These individuals most often indicated that threats associated with gamification had serious consequences and occurred relatively often or very often. The third cluster was an intermediate one, comprising respondents who assessed both the severity and the frequency of negative consequences of gamification at moderate levels. This group may therefore be described as cautious realists.

The next step was to compare the resulting clusters with the values of synthetic variables representing factors that may have influenced respondents' answers. A one-way analysis of variance was used to identify which factors differentiated the clusters most clearly. The results are presented in Table 5 and include only indicators that met the adopted criteria. The only latent factor that had a clearly statistically significant effect on differences between the groups in terms of perceived threat severity and frequency was attitude toward preparation for the gamification process. Individuals who declared a higher level of understanding of gamification and placed greater emphasis on proper planning and implementation tended, on average, to perceive the negative effects of gamification as both more severe and more frequent. The Discussion section addresses this relationship in greater detail.

Table 5.
Results of one-way analysis of variance for the identified clusters

Factor	**F statistic**	**p-value**	**Mean (Cluster 1)**	**Mean (Cluster 2)**	**Mean (Cluster 3)**
Motivation and engagement (Cronbach's α = 0.874)	*1.4706*	*0.2402*	*4.73*	*4.38*	*4.52*
Efficiency and pleasure (Cronbach's α = 0.828)	*0.6133*	*0.5458*	*4.02*	*3.92*	*4.16*
*Process and preparation*** *(Cronbach's α = 0.663)*	***5.6097***	***0.0065***	***4.75***	***4.27***	***4.61***

Source: authors' own study.

The variable process and its preparation consists of responses to the following statements: the effectiveness of gamification depends on its planning, the effectiveness of gamification depends on its implementation, and I understand what gamification is.

5. Discussion

The results presented in this section come from an exploratory pilot study and should therefore be interpreted with caution.

The findings indicate that, in the analyzed sample, in-depth knowledge of gamification among Generation Z respondents is not as widespread as might be expected in a cohort functioning in a highly digitalized environment. Although respondents rated the influence of gamification on motivation and engagement relatively highly, they also expressed little confidence in the ease of designing and implementing gamification. This may suggest that their understanding of gamification is often intuitive and grounded in user experience rather than in knowledge of the design processes underlying effective implementation. The literature suggests that gamification is sometimes understood in a simplified way, reduced to mechanisms such as points, badges, or rankings, without sufficient attention to the broader design and motivational context (Dicheva et al., 2015; Toda et al., 2017).

Another important result of the study is the identification of three preliminary profiles of attitudes toward gamification: gamification enthusiasts, cautious realists, and gamification skeptics. These profiles should be treated as exploratory rather than as stable population segments. The distinction reflects different interpretations of potential threats arising from the use of game mechanics in work and education settings. Enthusiasts tend to downplay threats and assign them a low probability of occurrence, whereas skeptics perceive them as more severe and more frequent. Between these two positions lies a group of realists who assess both the severity and the probability of threats at a moderate level. This diversity of attitudes is consistent with research on the perception of digital technologies, which points to the coexistence of enthusiastic, skeptical, and moderate attitudes toward new technological solutions (Hammedi et al., 2021; Kim, Werbach, 2016).

One of the key factors differentiating the identified clusters was the importance respondents attached to the gamification design process, including their understanding of the concept itself and the importance they assigned to planning and implementation quality. Respondents declaring a higher level of understanding of gamification were also more likely to perceive potential negative consequences. This may suggest that awareness of gamification-related risks increases with knowledge of its mechanisms. The literature emphasizes that many negative effects of gamification stem not from the idea of using game elements as such, but from

improper design or inadequate adaptation to the user and context (Hanus, Fox, 2015; Almeida et al., 2021).

From a human resource management perspective, these findings suggest the need to design gamification systems in a more balanced manner, taking into account both potential motivational benefits and the risks associated with excessive competition, social pressure, and overemphasis on rewards. This is particularly important in the case of Generation Z, which is simultaneously highly familiar with digital feedback and reward systems and more sensitive to issues of autonomy and psychological well-being (Dolot, 2018; Hammedi et al., 2021).

In practice, this means that gamification should be treated not as a simple set of motivational techniques, but as a complex design process requiring appropriate preparation, analysis of user needs, and conscious management of possible implementation consequences. Careful preparation of the gamification process—including planning, implementation, and communication of how the system operates—may therefore be a crucial factor in reducing the risk of the negative effects described in the literature. The present findings should thus be regarded as a starting point for further research on larger and more diverse samples.

6. Research limitations

The study has several limitations that should be taken into account when interpreting the results. First, the small sample size substantially limits the generalizability of the findings to the broader Generation Z population. The results should therefore be treated as preliminary and exploratory and require verification in larger and more diverse samples.

Another limitation is the use of analytical methods typical of exploratory research, particularly cluster analysis, the results of which—especially with small sample sizes—may be sensitive to data structure and methodological assumptions. For this reason, the identified clusters should be treated as preliminary response profiles that may support hypothesis generation and help identify promising directions for further investigation, rather than as stable and unambiguous segments of the study population. Similarly, the results of comparative analyses (ANOVA) are ancillary and should be interpreted with caution, especially in the context of a small sample. Their primary value lies in supporting theory development and planning subsequent stages of research.

Finally, it should be emphasized that this was a pilot study aimed primarily at identifying potential patterns in the perception of gamification-related risks and at laying the groundwork for further, more advanced analyses. Future studies should therefore involve larger and more diverse samples and adopt a confirmatory approach, including the formulation and testing of research hypotheses.

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