

Methodology

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Overview

Ludograph measures two things about every game and reports them independently. The first is what a child stands to gain from playing — measured as a Benefits Development Score (BDS) across cognitive, social-emotional, and motor dimensions. The second is the design pressure the game exerts on a developing brain — measured as a Risk Influence Score (RIS) across compulsion-loop design, monetization pressure, and social risk. From these two scores, Ludograph derives two outputs: a Ludograph rating (0–100), which is a harmonic mean of benefit and safety that penalises games that are high-risk or low-benefit on either axis; and a daily time recommendation in five tiers, derived from the RIS with adjustments for unusually high or low benefit scores. Many games score meaningfully on both axes simultaneously, and Ludograph is designed to make that visible rather than collapse it into a single judgement.

Ludograph does not measure how much a child enjoys a game, how skilled a player is, or whether a particular title is "good" or "bad" in any general sense. It measures structural design choices — what the game asks of a player and what mechanisms it uses to keep them playing. A beloved family favourite can carry meaningful design risks; a forgettable puzzle game can quietly deliver real cognitive benefit. The framework is deliberately separated from taste, popularity, and critical reception, all of which are well-served by other rating systems.

The framework is designed to be auditable. Every dimension has a fixed scoring scale, every category has a documented weight, and every score carries the methodology version that produced it. When the rubric changes, a new version is published and prior versions remain queryable. Reviewers — whether human or automated — score against

the same rubric, with reference titles used to calibrate against drift. Limitations and edge cases (UGC platforms, live-service content, automated scoring) are documented openly in the Limitations section below rather than buried.

The Scoring Model

Every Ludograph game profile produces two independent composite scores and a time recommendation derived from them.

Benefits Development Score (BDS)

The BDS combines three benefit categories using fixed weights:

CATEGORY	WEIGHT
B1 — Cognitive development	50%
B2 — Social-emotional development	30%
B3 — Physical and motor development	20%

Each category score is normalised to 0–1 before weighting.

Formula: $BDS = (B1_norm \times 0.50) + (B2_norm \times 0.30) + (B3_norm \times 0.20)$

Risk Influence Score (RIS)

The RIS combines three risk categories. Content risk (R4) is reported separately and does not feed into the time recommendation — this preserves compatibility with ESRB and PEGI ratings.

CATEGORY	WEIGHT
R1 — Compulsion-loop design	45%
R2 — Monetization pressure	30%
R3 — Social and emotional risk	25%

Formula: $RIS = (R1_norm \times 0.45) + (R2_norm \times 0.30) + (R3_norm \times 0.25)$

The Ludograph rating

The Ludograph rating is the single 0–100 headline number shown on every game card. It is the harmonic mean of Benefit (BDS) and Safety (defined as $1 - RIS$), scaled to 0–100:

Formula:
$$\text{Ludograph rating} = \text{round}(100 \times (2 \times \text{BDS} \times (1 - \text{RIS})) / (\text{BDS} + (1 - \text{RIS})))$$

A harmonic mean was chosen deliberately over an arithmetic average: it is dominated by the *weaker* of its two inputs. A game cannot buy back a high Ludograph rating with strong benefits if its risk profile is poor, and a perfectly safe game with nothing to offer developmentally does not score well either. Both axes must be good for the number to be good. If $\text{BDS} + (1 - \text{RIS})$ is zero the Ludograph rating is 0. R4 content risk does not enter the Ludograph rating — it is surfaced through the age recommendation instead (see the Age-Floor Policy below).

Rating letters (A–E)

Each 0–100 rating maps to one of five letter bands. The letter, its verdict word, and the color tone shown on cards all derive from a single versioned threshold table — there is exactly one set of cuts in the system:

LETTER	RATING	VERDICT WORD	SHARE OF CATALOG ¹
A	68–100	Recommended	12.4%
B	58–67	Good	27.5%
C	45–57	Mixed	36.6%
D	32–44	Caution	16.6%
E	0–31	Avoid	7.0%

¹ At calibration (2026-07 catalog, n = 23,614).

Why these cuts. The harmonic mean compresses the top of the scale — very few titles score above 85 — so conventional school-style cuts (90/80/70...) would leave the A band effectively unreachable or push two-thirds of the catalog into E. The cuts above were anchored to catalog percentiles at calibration time and then **frozen as constants**. They are deliberately never re-derived from the live catalog: a game's letter must never change because *other* games were rescored.

Letter stability (hysteresis). Roughly 40% of titles sit within ± 2 points of some band boundary — a structural property of any healthy cut set, not a calibration flaw. To keep letters meaningful across routine rescores, a game's letter only changes when a rescore clears the band boundary by **more than 2 points**, or when the same new letter is produced by two consecutive rescores. The underlying 0–100 rating always updates freely and is always shown; only the letter is damped.

The same bands apply to standalone games and UGC experiences (Roblox, Fortnite Creative) — one system, one vocabulary.

Time recommendation tiers

The primary output is a recommended daily time limit derived from the RIS, with adjustments for high-benefit, low-benefit, and physically active games.

RIS RANGE	BASE RECOMMENDATION
0.00 – 0.15	120 min/day
0.16 – 0.30	90 min/day
0.31 – 0.50	60 min/day
0.51 – 0.70	30 min/day
0.71 +	Not recommended — no daily minutes are served for this tier

Tier adjustments:

If $BDS \geq 0.60$ and $RIS \leq 0.70$: recommendation extends one tier (e.g. 60 $\rightarrow$ 90 min)

If $physical\ activity\ (B3.4) \geq 3$ and $RIS \leq 0.50$: recommendation extends one additional tier (*added in v1.2*)

If $physical\ activity\ (B3.4) \geq 3$ and $RIS > 0.50$: no tier change; the recommendation carries a context note that the game involves significant physical activity but its engagement mechanics keep the time budget unchanged

If $BDS < 0.20$ and $RIS > 0.30$: recommendation drops one tier (e.g. 60 $\rightarrow$ 30 min)

The benefit extension and the physical-activity extension can stack: a game with $BDS \geq 0.60$, $B3.4 \geq 3$, and $RIS \leq 0.50$ is genuinely exceptional by this rubric's standards and

may move two tiers. The rationale for the physical-activity rule is that the daily time budget exists primarily to address *sedentary* screen time; a game that has the child physically moving (VR fitness, dance, AR walking) directly offsets that concern. Above **RIS 0.50** the compulsion mechanics are significant enough that additional exposure time compounds risk regardless of movement — hence the note-only treatment.

Age adjustments (applied per child at display time, not stored):

Under 6: minutes are halved and capped at 30

Ages 13–17: the recommendation extends one tier when content is age-appropriate, defined as normalised content risk (R4) below 0.60

Age gate: when a game's `recommendedMinAge` reaches 17 or above (see the Age-Floor Policy), the time recommendation is suppressed entirely and replaced with an age-restriction notice. A children's daily play-time budget has no referent for a title whose recommended audience is not children.

RIS gate: when the RIS exceeds 0.70 the numeric budget is likewise suppressed. The top tier's verdict is already *not recommended*; serving a "15 min/day" figure alongside it contradicts the verdict, so no minutes are shown and the label carries the recommendation instead.

B1 Cognitive

Rationale: Cognitive development is the largest single weight in the BDS (50%) because the age range Ludograph targets — roughly six to sixteen — overlaps with significant maturation of executive function, working memory, spatial reasoning, and metacognition. Games occupy a meaningful share of discretionary time in this window. The mechanics a child engages with repeatedly during this period are not neutral: they constitute a form of practice. Some games offer rich, varied cognitive challenges; others offer narrow, repetitive ones. The B1 dimensions attempt to characterise that landscape so parents and partners can distinguish between superficially similar titles that differ substantially in what they actually train.

What's measured: Ten dimensions, each scored 0–5 against fixed criteria by the assigned reviewer — the automated pipeline or a human expert, as marked by each rating's review tier:

DIMENSION	WHAT IS ASSESSED
Problem solving	Novel problems requiring reasoning, experimentation, or logic
Spatial awareness	Mental rotation, 3D navigation, map reading, spatial planning
Strategic thinking	Planning ahead, resource management, evaluating trade-offs
Critical thinking	Evaluating information, questioning assumptions, evidence-based decisions
Memory and attention	Working memory, sustained attention, pattern recognition
Creativity and expression	Open-ended tools for building, designing, composing, or storytelling
Reading and language	Vocabulary, reading comprehension, narrative understanding
Math and systems thinking	Numerical reasoning, economic systems, statistical thinking
Learning transfer	Knowledge or skills that apply outside the game
Adaptive challenge	Difficulty that scales with player skill (flow state design)

Scoring: Sum of 10 dimensions (0–5 each). Max 50. Normalised to 0–1 for weighting.

Weighting: B1 contributes 50% of the BDS — the largest single weight, reflecting the centrality of cognitive development in the age ranges Ludograph targets.

Research basis:

Bavelier, D. & Green, C.S. (2019). Enhancing attentional control: Lessons from action video games. *Neuron*, 104(1), 147–163.

Granic, I., Lobel, A., & Engels, R.C.M.E. (2014). The benefits of playing video games. *American Psychologist*, 69(1), 66–78.

Uttal, D.H., et al. (2013). The malleability of spatial skills: A meta-analysis of training studies. *Psychological Bulletin*, 139(2), 352–402.

Sala, G., Tatlidil, K.S., & Gobet, F. (2018). Video game training does not enhance cognitive ability: A comprehensive meta-analytic investigation. *Psychological Bulletin*, 144(2), 111–139. (Included deliberately as a critical counterweight —

Ludograph does not claim broad transfer effects, and the B1 framework distinguishes specific trained skills from general cognitive enhancement.)

B2 Social-Emotional

Rationale: Cooperative play, narrative-driven games, and well-moderated multiplayer environments can develop genuine social and emotional skills — perspective-taking, emotional regulation under pressure, ethical reasoning in low-stakes contexts. The same structural feature that makes games effective at training these skills (sustained social interaction with consequence) also makes them vulnerable to exploitation, which is why the social-emotional dimensions are scored separately from social-emotional risks (R3). A game can simultaneously develop authentic teamwork (high B2) and expose a child to identity pressure or unmoderated strangers (high R3); these are independent axes and the framework treats them that way.

What's measured: Six dimensions, each scored 0–5:

DIMENSION	WHAT IS ASSESSED
Teamwork and cooperation	Genuine collaboration where players depend on each other
Communication skills	Meaningful communication between players
Empathy and perspective-taking	Understanding other viewpoints, cultures, or emotional experiences
Emotional regulation	Persistence, managing frustration, coping with loss — through design, not punishment
Ethical reasoning	Moral dilemmas, consequences for choices, opportunities to consider fairness
Positive social interaction	Moderated multiplayer, prosocial incentives, constructive community design

Scoring: Sum of 6 dimensions (0–5 each). Max 30. Normalised to 0–1 for weighting.

Weighting: B2 contributes 30% of the BDS.

Research basis:

Greitemeyer, T. & Mügge, D.O. (2014). Video games do affect social outcomes: A meta-analytic review of the effects of violent and prosocial video game play. *Personality and Social Psychology Bulletin*, 40(5), 578–589.

Harrington, B. & O'Connell, M. (2016). Video games as virtual teachers: Prosocial video game use by children and adolescents from different socioeconomic groups is associated with increased empathy and prosocial behaviour. *Computers in Human Behavior*, 63, 650–658.

B3 Motor

Rationale: Motor development is the smallest weight in the BDS (20%) because the dominant concern for screen time in this age range is sedentary behaviour rather than fine-motor deficit. The dimension is retained because some games – particularly motion-controlled, VR, and AR titles – meaningfully extend into physical activity, and because hand-eye coordination training has documented co-benefits in attention and reaction tasks. Games that contribute negligibly to motor development are scored low here without penalty to the overall BDS provided they perform well on B1 and B2.

What's measured: Four dimensions, each scored 0–5:

DIMENSION	WHAT IS ASSESSED
Hand-eye coordination	Precise timing, aiming, coordination between visual input and motor response
Fine motor skills	Precise small-muscle movements, dexterity, touch precision
Reaction time	Quick reflexes and rapid decision-making
Physical activity	Whole-body movement (VR, motion controls, AR)

Scoring: Sum of 4 dimensions (0–5 each). Max 20. Normalised to 0–1 for weighting.

Weighting: B3 contributes 20% of the BDS. In addition, physical activity (B3.4) has a direct modifier path into the time recommendation from v1.2 onward – see the tier adjustments under The Scoring Model. This exists because B3.4 alone cannot meaningfully move the BDS (it is one of four items in the smallest category), yet whole-body movement directly addresses the sedentary concern that motivates the time budget in the first place.

VR and motion guidance

Scoring anchors for VR, motion-controlled, and AR titles (*added in v1.2*):

Physical activity (B3.4): 5 for sustained whole-body play (VR fitness, dance titles, room-scale VR with constant movement); 4 for AR titles built around real-world walking (e.g. location-based catch-and-explore games) and motion titles with intermittent full-body input; 3 for standing VR with regular arm/torso movement; 1–2 for seated VR or motion controls used only as a pointer. Standard controller/keyboard play is 0.

Hand-eye coordination (B3.1) and reaction time (B3.3): typically elevated in VR action and rhythm titles, where tracked-controller precision and real-time response are the core mechanic. Score what the design demands, not the platform — a slow VR puzzle game does not get action-game motor scores for being in VR.

Spatial awareness (B1.2): room-scale VR systematically exercises mental rotation and 3D spatial reasoning; a genuine VR navigation or building mechanic justifies a higher B1.2 than an equivalent flat-screen title.

Fear and horror (R4.5): presence amplifies intensity. Horror content that would score 2 on a flat screen can warrant 3 in VR — assess the experienced intensity, not the asset list.

Research basis:

Polechoński, J., Dębska, M., & Dębski, P.G. (2019). Exergaming can be a health-related aerobic physical activity. *BioMed Research International*, 2019, Article 1890527.

Li, R., Polat, U., Makous, W., & Bavelier, D. (2009). Enhancing the contrast sensitivity function through action video game training. *Nature Neuroscience*, 12(5), 549–551.

R1 Compulsion-Loop Design

Rationale: Compulsion-loop design is weighted highest in the RIS (45%) because the mechanisms involved — variable ratio reward schedules, near-miss feedback, loss aversion triggers, time-limited urgency — are the most thoroughly documented in behavioural psychology and the most aggressively engineered into modern free-to-play games. The same techniques are used in regulated gambling products. The developmental concern is acute: the prefrontal regulation that helps adults resist these mechanisms is still maturing through adolescence. R1 attempts to characterise the

intensity and variety of these mechanisms in a given title, on the principle that a game with one mild streak feature and a game built end-to-end around variable rewards present qualitatively different risks even if both technically contain "engagement design".

What's measured: Ten risk factors, each scored 0–3:

FACTOR	DESCRIPTION
Variable ratio rewards	Random reward schedules (loot boxes, gacha)
Streak mechanics	Daily login rewards with penalties for missing
Loss aversion triggers	Resources that decay or opponents that advance while absent
FOMO / time-limited events	Content that disappears, creating urgency
Artificial stopping barriers	Energy/lives systems that create frustration pressure
Notification and re-engagement	Notifications designed to create anxiety
Near-miss mechanics	Deliberate "almost won" feedback mimicking gambling
Infinite scroll / endless play	Auto-play, no natural endpoints
Escalating commitment	Sunk-cost design ("I've invested too much to stop")
Variable reward frequency	Precisely calibrated reward timing (slot machine pattern)

Scoring: Sum of 10 factors (0–3 each). Max 30. Normalised to 0–1 for weighting.

Weighting: R1 contributes 45% of the RIS — the highest weight, reflecting the documented developmental harm of these mechanics in children's products.

Research basis:

Zagal, J.P., Björk, S., & Lewis, C. (2013). Dark patterns in the design of games. *Proceedings of Foundations of Digital Games (FDG 2013)*.

Schüll, N.D. (2012). *Addiction by Design: Machine Gambling in Las Vegas*. Princeton University Press.

Zendle, D. & Cairns, P. (2018). Video game loot boxes are linked to problem gambling: Results of a large-scale survey. *PLOS ONE*, 13(11), e0206767.

King, D.L. & Delfabbro, P.H. (2018). Predatory monetization schemes in video games (e.g., 'loot boxes') and Internet gaming disorder. *Addiction*, 113(11), 1967–1969.

UK Competition and Markets Authority (2022). Online choice architecture: How digital design can harm competition and consumers. Discussion paper.

The R1 dimension list draws on the SHARP-G framework (Saini, Hodgins et al., 2024 – *Journal of Behavioral Addictions*), adapted for children's contexts.

R2 Monetization

Rationale: Monetization pressure (R2, 30% of RIS) is scored separately from compulsion-loop design because the mechanisms are distinct even when they co-occur. R1 measures psychological extraction — how strongly the game pulls a child into continuing to play. R2 measures financial extraction — how strongly the game pulls a child or parent into continuing to spend. A game can be high on one and low on the other: a free advertising-funded game may have minimal monetization pressure but heavy compulsion-loop design; a flat-fee premium title may have low compulsion-loop design but in-game purchase prompts targeting children. R2 is particularly load-bearing in regulatory contexts (UK Children's Code, FTC guidance on dark patterns in children's apps), and partner products typically need to filter on it independently of overall game quality.

What's measured: Eight risk factors, each scored 0–3:

FACTOR	DESCRIPTION
Spending ceiling	Whether unlimited spending is possible
Pay-to-win mechanics	Gameplay advantage from spending
Currency obfuscation	Multiple virtual currencies obscuring real cost
Spending prompts	Prompts triggered by failure or frustration
Child-targeting design	Purchase UI explicitly targeting younger users
Ad pressure	Frequency and intrusiveness of advertising

FACTOR	DESCRIPTION
Subscription pressure	Auto-renewal, locked features
Social spending pressure	Gifting mechanics, peer pressure to spend

Scoring: Sum of 8 factors (0–3 each). Max 24. Normalised to 0–1 for weighting.

Weighting: R2 contributes 30% of the RIS.

Research basis:

Federal Trade Commission (2022). Bringing dark patterns to light. FTC Staff Report.

Information Commissioner's Office, UK (2020). Age Appropriate Design: a code of practice for online services (Children's Code).

Fitton, D. & Read, J.C. (2019). Creating a framework to support the critical consideration of dark design aspects in free-to-play apps. *Proceedings of IDC '19*, 407–418.

R3 Social Risk

Rationale: Social risk is scored independently of the positive social dimensions in B2 because they describe different phenomena even when they share a surface — multiplayer interaction. A game with strong cooperative design and active community moderation can develop genuine teamwork (high B2) while remaining low-risk (low R3). A game with the same multiplayer surface but without moderation, with public ranking, and with unmoderated voice chat available to strangers can develop similar surface skills while exposing a child to qualitatively different risks. R3 attempts to characterise those risks distinctly: the chance of toxic competitive environments, the presence of unknown adults in voice or chat, social comparison pressure tied to spending or in-game performance, and privacy practices. The most acute concern in this category — particularly for children under 13 — is unmoderated stranger contact, which is scored as its own factor and weighted heavily within R3.

What's measured: Six risk factors, each scored 0–3:

FACTOR	DESCRIPTION
Social obligation	Pressure to play from group expectations (guilds, team events)
Competitive toxicity	Rank anxiety, public shaming, limited moderation
Stranger interaction risk	Unmoderated communication with unknown adults
Social comparison	Prominent leaderboards, spending-visible cosmetics
Identity and self-worth	Self-worth linked to in-game performance or possessions
Privacy risk	Data collected on minors without transparent consent

Scoring: Sum of 6 factors (0–3 each). Max 18. Normalised to 0–1 for weighting.

Weighting: R3 contributes 25% of the RIS.

Research basis:

Kowert, R. (2020). Dark Participation in Games. *Frontiers in Psychology*, 11, 598947.

Internet Watch Foundation annual reports – relevant sections on grooming via gaming platforms.

5Rights Foundation (2021). Pathways: How digital design puts children at risk.

R4 Content Risk

Important: R4 is reported as a standalone content flag and **does not feed into the RIS or the time recommendation**. This is a deliberate design decision: content risk largely aligns with existing ESRB and PEGI ratings, and Ludograph's primary contribution is in areas those ratings don't cover (manipulation design, monetization, social risk).

Including R4 in the time recommendation would create overlap with regulatory systems and reduce the distinctiveness of the Ludograph rating. R4 does, however, drive two things: the recommended minimum age (see the Age-Floor Policy) and, through it, the age gate that suppresses the time recommendation on adult-floor titles.

What's assessed: Six factors, each scored 0–3:

FACTOR	EXAMPLES
Violence level (R4.1)	None → mild cartoon → moderate realistic → graphic
Sexual content (R4.2)	None → mild suggestive → moderate themes → explicit
Language (R4.3)	None → mild → moderate profanity → extreme/frequent
Substance references (R4.4)	None → mild references → depicted without consequence → depicted positively
Fear and horror (R4.5)	None → mild tension → moderate scares → intense horror
Simulated gambling (R4.6)	None → incidental wagering minigame → casino gambling as a significant mode → casino sim as core loop

Display: R4 scores are shown as a content advisory alongside the ESRB/PEGI rating on game pages, not as a component of the overall Ludograph rating. The normalised content-risk meter sums R4.1–R4.5 (max 15); R4.6 is reported as its own row and contributes to the age floor only (*see below*).

R4.6 Simulated Gambling

Added in v1.2. This dimension covers content that *depicts or simulates wagering* — it is distinct from the R1 mechanics dimensions (variable ratio rewards, near-miss design), which cover gambling-*like* reward psychology in non-gambling contexts. Loot boxes score under R1.1, not here.

SCORE	DESCRIPTION
0	No gambling content or wagering mechanics
1	Gambling imagery or an incidental chance-wagering minigame with fictional stakes, not central to the game (a tavern card game, a casino side-level in an adventure)
2	Simulated casino gambling — slots, poker, blackjack, roulette — as a significant mode, with a realistic wagering loop on virtual currency

SCORE	DESCRIPTION
3	Casino simulation as the core loop and/or real-money-adjacent design (purchasable chips, realistic odds presentation, sweepstakes or cash-out adjacency)

R4.6 is excluded from the content-risk meter sum. Including it would deflate the stored meter for every non-gambling title and shift thresholds that compare against it; the gambling signal is stronger as a hard age floor plus a visible advisory row than as a small nudge to an aggregate. Like fear, R4.6 has no context modifiers — severity is assessed directly in the 0–3 score.

Age-Floor Policy

Four of the six R4 dimensions produce a numeric `recommendedMinAge` for each game: violence (R4.1), sexual content (R4.2), fear/horror (R4.5), and simulated gambling (R4.6). Language (R4.3) and substance references (R4.4) inform the parent narrative and tips but do not set an age floor — they are contextual rather than developmentally threshold-linked.

DIMENSION	SCORE 0	SCORE 1	SCORE 2	SCORE 3
R4.1 Violence	0	7	13	17
R4.2 Sexual content	0	9	13	17
R4.5 Fear / horror	0	7	10	13
R4.6 Simulated gambling	0	10	13	17

Formula: `recommendedMinAge = max(violenceFloor, sexualFloor, fearFloor, gamblingFloor)` , then context modifiers are applied.

Score-1 asymmetry. Violence and fear both step to 7 at score 1 because PEGI 7 explicitly permits "non-realistic violence in a child-friendly context" and "a game may be considered frightening". Mild romantic or suggestive content (sexual score 1) steps to 9 instead, because relational scaffolding for that material is not reliably present until approximately age 9. Incidental gambling content (gambling score 1) steps to 10, below the age where wagering is modelled as normal play — ESRB places light Simulated Gambling descriptors around E10+/T. The asymmetry is developmental, not moral.

Fear caps at 13. Intense horror without graphic sexual or explicit violence content (R4.5 = 3 alone) places a game at the ESRB Teen / PEGI 16 boundary, not the adult boundary. The adult floor (17) is reserved for games where graphic violence, explicit sexual content, or core-loop gambling is the primary driver. A pure horror atmosphere – however intense – does not independently warrant an adult floor.

Gambling reaches 17 at score 3. PEGI has, since 2020, rated games that teach or glorify casino-style gambling 18 regardless of other content; ESRB treats real-gambling-adjacent design as M territory. Ludograph uses 17 – its house adult boundary – rather than strict PEGI steps (12/16/18), keeping the gambling floors on the same anchor set (10/13/17) as the rest of the policy.

Age gate on the time recommendation. When `recommendedMinAge` reaches 17, the daily time recommendation is suppressed and replaced with an age-restriction notice. A green "up to 120 min/day" badge next to an adult age floor is a contradiction; the age guidance takes precedence.

R4 context modifiers

Context modifiers apply only to the violence (R4.1) and sexual (R4.2) dimensions and add **+2 to the affected dimension's floor, capped at 17**. Fear and gambling are assessed directly in R4.5/R4.6 and have no modifiers. Modifiers are additive and stack within a dimension.

MODIFIER	APPLIES TO	CONDITION
<code>trivialized</code>	R4.1, R4.2	Violence or sexual content played for laughs or with no shown consequences
<code>defenceless_target</code>	R4.1 only	Violence against non-combatants, surrendered, or helpless characters
<code>mixed_sexual_violent</code>	R4.1 + R4.2	Sexual and violent content combined in the same scene; requires both R4.1 > 0 and R4.2 > 0

Research basis (R4.6):

King, D.L., Delfabbro, P.H., & Griffiths, M.D. (2010). The convergence of gambling and digital media: Implications for gambling in young people. *Journal of Gambling Studies*, 26(2), 175–187.

Drummond, A. & Sauer, J.D. (2018). Video game loot boxes are psychologically akin to gambling. *Nature Human Behaviour*, 2(8), 530–532.

PEGI (2020). PEGI introduces notice to inform about presence of paid random items and applies 18 rating to simulated gambling – criteria change applying the 18 rating to games teaching or glorifying casino-style gambling.

Bundled-Online Policy

Some titles ship a self-contained base game bundled with a separate live-service online mode under the same store listing – the pattern of a story campaign sold alongside an open online world with its own economy, or annual sports titles with online team-building modes. Ludograph **scores the base game** in these cases, and surfaces the online mode through a dedicated caution notice on the game page instead of folding its mechanics into the score.

The reasoning: a single blended score would misrepresent both halves. The base experience – often a finite, well-designed single-player game – would inherit monetization and FOMO scores it does not contain, while the online mode's genuine risks would be diluted into a middling number that alarms nobody. Parents make two separate decisions ("may my child play the campaign?" and "may my child play the online mode?") and the rating should support both.

In practice: R1/R2/R3 flags that belong exclusively to the online mode (live-service reward loops, real-money currency, stranger chat, social pressure) are scored 0 on the base-game review, and the online mode's risks are described in the caution notice. Editions and remasters of a flagged title inherit the same treatment automatically, so a "Definitive Edition" cannot silently re-blend the online mode into its score.

Update and Versioning Policy

Games are rescored under three triggers. First, automated rescore is initiated when the upstream metadata source (RAWG) reports a substantive update – DLC, platform expansion, or content patches that materially alter mechanics. Second, manual rescore is initiated for live-service titles where mechanics have changed in ways the automated pipeline did not detect. Third, ad-hoc rescore is initiated when Ludograph receives credible information about changes via community reports, regulatory action, or publisher disclosure.

The scoring weights, dimension definitions, scoring scales, and tier thresholds are locked within a methodology version. Any change to these — adding a dimension, adjusting a weight, redefining a tier boundary — requires publishing a new methodology version. Version numbers follow semantic versioning: minor version increments (1.0 → 1.1) for additive changes that do not alter existing scores, major version increments (1.0 → 2.0) for changes that require all games to be rescored. Every score carries the methodology version that produced it. Historical scores remain queryable under their original version via the `?version=X` parameter on this page and via the `methodology_version` field in the API. Partners consuming the API receive `methodology_version` and `calculated_at` fields on every score response.

Limitations and Edge Cases

UGC platforms (Roblox, Fortnite Creative). Ludograph scores individual experiences on UGC platforms as well as the platform itself. The platform score reflects the host environment (moderation quality, monetization model, stranger interaction risk). Individual experience scores reflect the specific content. Consumers of the API should be aware that a "Roblox" platform score is not a score for Roblox experiences as a category — individual experience scores vary widely and should be queried separately.

Live-service games with evolving content. Games with weekly content updates, seasonal events, or ongoing battle passes are scored on their current state at review time plus any persistent structural mechanics. Time-limited events are scored under R1 (FOMO) but the content of those events may not be individually reviewed. Live-service titles are prioritised for periodic rescore when mechanics change materially.

Early access games. Early access titles are scored at the state available at review time. Scores may change substantially on full release. Ludograph does not guarantee rescore coverage for all early access titles on release.

Regional content differences. Some games ship with different content ratings by region (e.g., a game rated M in North America may be rated 16+ in Europe with modified content). Ludograph scores the international/default release where possible. Regional variants are noted where known but are not systematically tracked.

AI-generated scores. Some scores are produced by an automated review pipeline using the Ludograph rubric as a prompt. These are marked `review_tier: automated` in the API. Expert and community reviews are marked accordingly. Automated scores

undergo periodic spot-check auditing but have not been individually verified by a human reviewer.

Research References

Consolidated bibliography for the framework. Individual sections above cite these inline where they bear on a specific dimension.

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Changelog

VERSION	DATE	SUMMARY
1.3 (current)	2026-07-06	Documentation-only revision — no formula, weight, or threshold affecting BDS, RIS, the Ludograph rating, age floors, or time recommendations changed. Introduced the rating letter bands (A ≥ 68 Recommended · B ≥ 58 Good · C ≥ 45 Mixed · D ≥ 32 Caution · E Avoid), percentile-anchored on the 2026-07 catalog (n = 23,614) and frozen as constants, replacing the informal 70/50/35 verdict-word thresholds previously used on cards — letters, verdict words, and card colors now derive from one versioned table. Documented letter hysteresis: a letter changes only when a rescore clears its band boundary by more than 2 points or the same letter persists across two consecutive rescoring; the numeric rating always updates freely. Same bands for games and UGC experiences.
<u>1.2</u>	2026-07-05	R4.6 (simulated gambling) added as a fourth age-floor dimension — floors 0→0, 1→10, 2→13, 3→17, no context modifiers, excluded from the content-risk meter. Triggered by divergence analysis: casino/slots/poker titles carrying adult store ratings scored R4 = 0 and received no age floor. Physical-activity time modifier added: B3.4 ≥ 3 extends the recommendation one tier when RIS ≤ 0.50 (stacking with the benefit extension), or adds a context note when RIS > 0.50. Documented previously-implemented behaviour: the 17+ age gate on the time recommendation, the teen-extension content gate (content risk < 0.60), the Ludograph rating harmonic-mean formula, and the bundled-online base-game policy. Added VR/motion scoring guidance and a consolidated research-references section. BDS and RIS

VERSION	DATE	SUMMARY
		formulas are unchanged; games with gambling content or significant physical activity may receive a different <code>recommendedMinAge</code> or time recommendation than under v1.1. Naming (2026-07-05): the former metric display name “LumiScore” was retired as part of the LumiKin → Ludograph brand rename; the score is now referred to as the unbranded “Ludograph rating”. The formula, weights, and 0–100 scale are unchanged. Terminology (2026-07-06): the R1 category display name “Dopamine manipulation design” was replaced by “Compulsion-loop design” across the site and this document, anchoring the category to the compulsion-loop construct in the games literature (Zagal, Björk & Lewis 2013; Schüll 2012; Fogg 2003); scoring items, weights, and formulas are unchanged. The consolidated reference list was expanded with the play-benefits and screen-time literature (Granic et al. 2014; Przybylski & Weinstein 2017; Orben & Przybylski 2019; Kardefelt-Winther 2017; RITEC; AAP 2016) and a citation correction (King & Delfabbro: 2018, <i>Addiction</i> 113(11), previously listed as 2019/114).
<u>1.1</u>	2026-05-01	Age-Floor Policy formalised. R4.5 (fear/horror) added as a third age-floor dimension alongside R4.1 (violence) and R4.2 (sexual content). Fear floors: 0→0, 1→7, 2→10, 3→13 (capped at 13 — intense horror alone does not warrant an adult floor). Context modifiers (<code>trivialized</code> , <code>defenceless_target</code> , <code>mixed_sexual_violent</code>) introduced for the violence and sexual dimensions. Triggered by divergence analysis: psychological-horror titles such as <i>What Remains of Edith Finch</i> (R4.5 = 2) were systematically underaged under v1.0 because fear was scored but ignored in floor computation. Games with <code>fearHorror ≥ 1</code> may receive a higher <code>recommendedMinAge</code> than under v1.0; BDS, RIS, Ludograph rating, and time recommendations are unchanged.
<u>1.0</u>	2026-04-26	Initial published methodology. All weights, dimensions, and tier thresholds as described in this document.

Ludograph

Game ratings grounded in child development

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