

AN OBJECTIVE FRAMEWORK TO DETERMINE PERMISSIBLE ONLINE REAL MONEY GAMES



VERSION 1.0

An Objective Framework to Determine Permissible Online Real Money Games

Authors - Padma Shri Dr. Bimal Roy:

Former Director of the Indian Statistical Institute, Kolkata, and Former Chairperson of the National Statistical Commission, Government of India

Kriti Singh

Chief of Staff and Programme Manager - Online Gaming, The Dialogue

Kazim Rizvi

Founding Director, The Dialogue

The Dialogue[®] is a public policy think tank with a vision to drive a progressive narrative in India's policy discourse. Founded in 2017, we believe in facilitating well-researched policy debates at various levels to help develop a more informed citizenry, on areas around technology and development issues. The Dialogue[®] has been ranked as the world's Top 10 think tanks to watch out for, by the Think Tank and Civil Societies Programme (TTCSP), University of Pennsylvania in their 2020 and 2021 rankings.

For more information
<https://thediologue.co>

Suggested Citation

Roy, B., Singh, K. & Rizvi, K. (2024, October). An Objective Framework to Determine Permissible Online Real Money Games: Version 1.0. The Dialogue[®]

Catalogue No

TD/OG/RP/1024/04

Publication Date

October 15, 2024

Disclaimer

The facts and information in this report may be reproduced only after giving due attribution to the authors and The Dialogue.[®]

CONTENTS

1. Executive Summary	1
2. Research Objectives and Methodology	2
3. Qualitative Parameters from Indian and Global Jurisprudence	4
3.1 Skill Judgements & Ensuing Principles	5
3.2 Determining Games of Skill under Global Jurisdictions	5
3.3 Decluttering Indian Jurisprudence for Determining Skill-Based Online Games	6
4. Quantitative Parameters to Determine Online Games of Skill	8
4.1 Determining 'Skill' in Online Games	8
4.2 Concept of 'Relative Skill'	8
4.3 Consistency of Skill	9
4.4 Refinement of Skill	9
4.5 Superior Level of Skill	9
4.6 Procedure	10
4.7 Application of Tests	11
4.7.1 Test 1: Persistence of Skill	11
4.7.2 Test 2: Experience Gap	11
4.7.3 Test 3: Exemplary Skill	13
5. Framework to Determine Games of Skill	14
Annexure - 1 Test Results of Gaming Formats	18
Persistence of Skill Test	18
Experience Gap Test	20
Exemplary Skill Test	22

ACKNOWLEDGEMENT

This report is the result of collective effort, expertise, and support of various individuals and organisations, to whom we are deeply indebted.

First and foremost, we would like to express our profound gratitude to Padma Shri Dr Bimal Roy, Former Chairperson of the National Statistical Commission, Government of India and Former Director of the Indian Statistical Institute, Kolkata, for his guidance. His expertise in statistical methodologies and objective frameworks played a critical role in shaping this work.

We express our sincere appreciation to the All India Gaming Federation (AIGF) and its members for providing us with gameplay data. Their inputs were invaluable in ensuring the applicability and accuracy of our findings.

Special appreciation is extended to the team at The Dialogue, who worked to develop and refine this report. We acknowledge Mr Pranav Bhaskar Tiwari, Ms Jameela Sahiba, Ms Akriti Jayant and Mr Shivam Kulshrestha, whose expertise ensured the successful completion of this project.

This report would not have been possible without the collective contributions of all these individuals and organisations, to whom we are deeply grateful. The feedback and collaboration was vital in developing the framework that protects user interests and aids the industry's needs.

This publication is the first version of the framework, which will be further developed and strengthened based on industry feedback, real-time testing, and government input.

1 | EXECUTIVE SUMMARY

The online gaming industry is booming, with the global market projected to grow from \$38 billion in 2019 to \$122 billion by 2025.¹ In India, factors like the widespread use of mobile devices, affordable data, a tech-savvy young population, and a passionate sports following have fuelled the industry's rapid growth. Valued at approximately \$4.2 billion in 2021, the industry is expected to reach \$20 billion by 2025², highlighting the need for a thorough examination of its regulatory and economic implications.

The Ministry of Electronics and Information Technology (MeitY) recognised the significant progress in this domain by publishing the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 (IT Rules),³ which include online gaming as an intermediary. MeitY's designation as the nodal ministry for online gaming in India further bolstered the commendable advancements within this burgeoning industry. This recognition is crucial as it grants independent recognition and focussed attention to online gaming as a distinct sector.

The amended IT Rules, via Clause 4A of Part II, outline the guiding principles governing self-regulatory bodies (SRBs) responsible for verifying online real money games. Pursuant to sub-rule (3), the SRB is entrusted with the task of ascertaining the permissibility of an online real money game upon receipt of an application from its member, subject to a comprehensive inquiry determining that the game "does not involve wagering on any outcome." However, challenges arise due to the ambiguity in the precise legal definitions of gambling and betting under the Public Gambling Act of 1867. Consequently, the onus fell on the honourable courts to interpret the differentiations between skill-based and chance-based games in light of the ever-evolving online gaming landscape. Indian jurisprudence emphasises the importance of substantial skill in assessing a game's legality. Indian courts, including the

Supreme Court and High Courts, have traditionally applied the "predominance test" to differentiate between games of skill and games of chance. If an online game demonstrates a significant degree of skill, it should to be considered permissible within the legal framework, even with the presence of an element of chance.

Despite explicit guidelines articulated in judicial pronouncements, the application of qualitative criteria in determining permissible online real-money games remains largely subjective. To address this, the imperative lies in establishing an objective framework that amalgamates qualitative parameters from court judgments with statistical tests. This paper endeavours to formulate a comprehensive skill framework that furnishes SRBs with "clear and consistent criteria," as mandated by clause 4A(2)(e)(i) of the Rules. By aligning with prevailing jurisprudence and employing specific statistical tests, the framework offers a quantitative assessment to differentiate games of skill from games of chance. This approach bridges the gap between legal interpretation and scientific methodologies, enabling stakeholders make well-informed decisions regarding the classification and verification of online games, thereby ensuring clarity and consistency.

The outcomes of this paper carry profound implications, contributing to the strengthening of the ecosystem. A transparent and objective framework for determining games of skill can foster innovation, establish a level playing field for operators, safeguard users' rights and interests, and promote responsible gaming practices. Additionally, it can catalyse the growth of the online gaming industry by instilling confidence and certainty among stakeholders.

¹ Impact of New GST Law on Skill-based Online Games, I. of N. G. L. on S. O. G. (2024). Impact of new GST law on skill-based online games. https://assets.ey.com/content/dam/ey-sites/ey-com/en_in/topics/tax/ey-impact-of-new-gst-law-on-skill-based-online-games.pdf?download

² Impact of New GST Law on Skill-based Online Games, I. of N. G. L. on S. O. G. (2024). Impact of new GST law on skill-based online games. https://assets.ey.com/content/dam/ey-sites/ey-com/en_in/topics/tax/ey-impact-of-new-gst-law-on-skill-based-online-games.pdf?download

³ Ministry Of Electronics And Information Technology Notification.. (2023, April 6).

<https://www.meity.gov.in/writereaddata/files/244980-Gazette%20Notification%20for%20IT%20Amendment%20Rules%2C%202023-%20relating%20to%20online%20gaming%20%26%20false%20information%20about%20Govt.%20business.pdf>

2 | RESEARCH OBJECTIVES AND METHODOLOGY

Determining the distinction between skill and chance is a complex and subjective task that requires a meticulous examination of case law and existing objective methodologies. Many global jurisdictions have endeavoured to address this issue by separately regulating skill-based games or exempting them from gambling regulations. For instance, both Indian and American courts have employed the predominant test to differentiate between skill-based games and gambling. This test necessitates the preponderance of one element over the other, albeit lacking a quantitatively defined criterion for establishing "more than," and thus open to subjective interpretation.

The Indian judiciary has evaluated and established critical factors for distinguishing between different game formats. In the landmark case of the *State of Bombay v RMD Chamarbaugwala*,⁴ the court distinguished competition from gambling activities by emphasising the role of substantial skill. Furthermore, in *RMD Chamarbaugwala v Union of India*,⁵ the court recognised skill-based competitions as constitutionally protected business activities under Article 19(1)(g). In *State of AP v K Satyanarayna*,⁶ the Supreme Court of India affirmed Rummy's skill-based nature due to the substantial skill involved in card handling. However, while these landmark judgments provide valuable insights, they often rely on subjective assessments. Therefore, implementing a robust skill framework is essential to address this complexity.

By incorporating legal principles from Supreme Court and High Court judgments over several decades, along with quantitative tests, the proposed objective framework aims to establish a standardised approach for identifying games of skill. The following chapters outline both the objective and subjective parameters that will form the basis of this framework. This proposed framework will guide SRBs in certifying permissible online real money games by effectively determining whether a game is predominantly

skill-based.

Moreover, the proposed framework will harmonise the various criteria identified by the judiciary and the methods employed by the scientific community to differentiate between games of skill and games of chance. Although these approaches, as of now, offer valuable insights into specific formats, their ability to provide a comprehensive and holistic outlook is limited. Existing approaches operate independently and focus on limited factors such as game format, player count, or mechanics. In the dynamic and constantly evolving online gaming industry, where new formats continually emerge, relying on these methodologies individually proves inadequate for accurately determining game classification. Therefore, this paper develops an objective framework that consolidates and standardises these diverse methodologies, presenting a unified approach to classifying games of skill.

To achieve this goal, we first analysed parameters derived from case law:

- **Predominance of Skill:** The courts have observed that while an element of chance may exist in a skill-based game, the element of skill predominates over chance. Factors such as skills, judgement, discretion, experience, and training significantly influence gameplay outcomes.
- **Persistence of Skill:** Skill-based games offer the potential for users to improve their performance and achieve better results through practice and skill development. In contrast, games of chance do not offer opportunities for skill progression and learning.
- **Skill Gradient:** Games where outcomes primarily depend on the player's superior knowledge, training, attention, experience, and dexterity – despite the presence of chance elements – are considered skill-based. The influence of skill

⁴ State of Bombay v. RMD Chamarbaugwala, AIR 1957

⁵ RMD Chamarbaugwala v. Union of India, 1957 AIR 628, 1957

⁶ State of A.P. v. K Satyanarayna, 1968 AIR 825, 1968

⁷ RMD Chamarbaugwala v. Union of India, 1957 AIR 628, 1957

⁸ Dr. K.R. Lakshmanan v. State of Tamil Nadu, AIR (1996)

⁹ Varun Gumber v. Union Territory of Chandigarh (2017 Cri LJ 3827)

on success in these games outweighs the impact of chance.

Subsequently, we used statistical methods to identify three comprehensive tests conducted on substantial actual data. We based our assessment methodology for evaluating game formats - whether they are games of skill or chance - on legal jurisprudence and statistical expertise, including analysis techniques, probability assessments and data-driven methodologies. These tests are-

- **Persistence of Skill:** To examine whether skill persists across periods, those with high success rates in one period will have high success rates in another non-overlapping period, and vice versa, in a game of skill.
- **Experience Gap:** To statistically examine whether players with more experience than their opponents have higher success rates. While players with significant experience can display higher success rates, success rate depends on the experience of the opponent as well.
- **Exemplary Skill:** Examine whether a segment of players demonstrates an exemplary skill set among multiple users and their levels. The presence of a few highly skilled individuals who outperform others indicates the existence of a skill-based element within the game.

We performed each of these tests using two different approaches to evaluate user data to measure skill in the game. First, we applied the Chi-Square test, a hypothesis testing method, to understand the association between two attributes. If the test results were insignificant, no further analysis was needed. However, if the results were significant, we then conducted the Pearson Correlation test to further assess skill in the game.

These tests and the respective statistical methods were cumulatively applied to various game formats to produce data sets that were arithmetically analysed to arrive at respective benchmarks that must be satisfied to be warranted as a game of skill.

On an additional note, in cases where sufficient actual

data is unavailable, such as during the development or beta phase of an online game format, we can perform these tests using simulations. Simulations offer a controlled environment that isolates specific skills, enabling a focused initial evaluation. Following this, we should conduct data-based testing with accurate gameplay data to gain a more comprehensive understanding of a player's overall performance and skill level.

The first chapter of this study discusses the jurisprudence that evolved over the years by various Indian and foreign Courts to determine whether a game is skill-based or chance-based. Based on this jurisprudence, the second chapter delves into the comprehensive understanding of the critical quantitative criteria that play a role in effectively distinguishing between games of skill and chance. The interplay of these criteria, derived from the existing case laws and scientific methodologies, forms the foundation on which the statistical tests are built. The following chapter presents the minimum common denominators identified through statistical tests. Online games being assessed must meet these denominators to be classified as skill-based games. Based on the subjective criteria and tests derived, the subsequent chapters develop a skill-based framework that the SRBs and relevant entities could deploy to qualify their game as games of skill.

3 | QUALITATIVE PARAMETERS FROM INDIAN AND GLOBAL JURISPRUDENCE

The rapid growth and innovation in the online gaming industry, coupled with the lack of clear guidelines have led to the conundrum of what constitutes a game of skill, especially when elements of chance are involved. Many online real money games now incorporate both skill and chance, rather than being purely one or the other. But they all constitute some element of both skill and chance. While courts acknowledge this, the case laws to date remain largely subjective.

A significant challenge faced by online real money skill gaming platforms is the frequent conflation with “gambling/betting” due to the absence of clear, uniform regulations. In India, most states have adopted the Public Gambling Act of 1867 with minor modifications.¹⁰ However, some of them enacted local laws prohibiting gambling/betting and have extended these to include online gaming. Despite various Supreme Court and High Court judgments, a few states continue to prohibit games of skill when played for money.

In its guiding principles, the NITI Aayog¹¹ laid down the need to create a ‘uniform safe harbour’ for fantasy sports operators within the country. These principles also highlighted the importance of establishing a self-regulatory organisation, encouraging responsible gaming practices, and adopting a light-touch regulatory approach. Most of these principles have been incorporated into the amended IT Rules, which are currently awaiting implementation.

As the online gaming sector continues to expand and evolve, a robust framework must balance innovation with consumer protection. To understand the legal considerations and measures shaping the online gaming industry, it is essential to examine the parameters derived from Indian and global jurisprudence. This literature review explores various judgements and tests employed by courts to determine whether online games are games of skill.

3.1. Skill Judgements & Ensuing Principles

The Indian courts have laid down the ‘predominant test,’ holding that a game of chance is determined entirely or largely by luck, while a game of skill depends on the players’ superior knowledge, experience, and adroitness. The courts concluded that although an element of chance exists in a skill game, the element of skill predominates over chance.¹² Reliance on this test dates back to 1957 in the case *R. M. D. Chamarbaugwalla v. The Union Of India*.¹³ In this case, the Supreme Court adopted a significant legal approach by employing the “skill test” to determine whether a particular activity should be categorised as gambling. This test aimed to establish whether the outcome of the activity primarily hinged on the participant’s skill or was predominantly governed by chance. The court’s ruling yielded a crucial distinction: activities that relied on skill were classified as commercial endeavours, and were thus granted the protection enshrined in Article 19(1)(g) of the Constitution. The court drew a clear line between skill-based activities and gambling. It acknowledged that while skill-based undertakings were integral to the commercial landscape and merited constitutional protection, gambling operated in a distinct sphere. Gambling, characterised as a realm outside the conventional bounds of commerce (*res extra commercium*), was deemed to fall beyond the scope of Article 19(1)(g) and Article 301 of the Constitution, which are primarily concerned with safeguarding the integrity of trade and commerce activities.

Over the years, the judiciary has considered this principle when evaluating various games. In the case of *State of Andhra Pradesh v. K. Satyanarayana*,¹⁴ the Supreme Court meticulously assessed the classification of Rummy as a game of skill. The court

¹⁰ The Public Gaming Act (1867) Retrieved from <https://thc.nic.in/Central%20Governmental%20Acts/Public%20Gambling%20Act,%201867.pdf>

¹¹ Guiding principles for the Uniform National Level Regulation of Online Fantasy Sports Platforms in India (2020 December) NITI Aayog Retrieved from https://niti.gov.in/sites/default/files/2020-12/FantasySports_DraftForComments.pdf

¹² Dr. K.R. Lakshmanan v. State Of Tamil Nadu, 1996 AIR 1153

¹³ R. M. D. Chamarbaugwalla v. The Union Of India, AIR 1957 SC 628

¹⁴ State of A.P. v. K. Satyanarayana, AIR 1968, SC 825

firmly determined that Rummy qualifies as a game of skill, even with the presence of certain elements of chance. To reach this conclusion, the Court conducted a thorough examination, carefully weighing the game's reliance on skill against chance. The court's assertion that Rummy necessitates a certain amount of skill is grounded in its recognition of specific intricacies within the game. The court highlighted the significance of memorising the fall of the cards - a skill that players must cultivate to excel. Additionally, the process of building a winning hand in Rummy demands a considerable skill in strategically holding and discarding cards, underscoring the thoughtful decision-making process integral to gameplay. The court's ruling emphasised that, despite its chance components, Rummy does not align with games purely based on luck. This recognition highlights a critical aspect of legal interpretation: the degree of skill involved in a game can outweigh the element of chance, ultimately shaping the legal status of the activity.

Similarly, in the landmark case of *Gurdeep Singh Sachar v. Union of India*,¹⁵ the High Court of Bombay reaffirmed the legality of fantasy games operated by Dream 11, emphasising that they do not involve betting or gambling. The court based this observation on the fact that the outcome of contests in the 'Dream 11' game is not dependent on the real-world match result, such as a team's victory or defeat. In forming its conclusion, the Bombay High Court drew upon the precedent established by the apex court in *KR Lakshmanan vs State of Tamil Nadu*,¹⁶ where the court held that if success in a game arises out of the user's exercise of superior knowledge, judgement and attention, then such a game does not meet the criteria for being categorised as 'gambling.'

In the case of *Varun Gumber vs UT of Chandigarh and others*¹⁷, the Punjab and Haryana High Court recognised the skill-based nature of fantasy sports. The court held that engagement in fantasy sports games necessitates participants to meticulously assess the relative worth of each athlete within the expansive pool of options. Such an evaluation mandates an intricate understanding of both the athletes' individual abilities and the broader context of the game's rules, regulations, strengths and vulnerabilities. As a result, the court recognised that

winning in fantasy sports format, in this case, offered by the Dream 11 platform, depends on players' ability to effectively apply their comprehensive knowledge and nuanced judgement. Through these means, participants strategically shape their virtual teams, aiming to optimise their performance within the constructs of the game. The court acknowledged that these digital gaming contests transcend mere chance-based games, as participants' strategic acumen, informed judgments, and intricate understanding of the sporting landscape collectively form the bedrock upon which successful gameplay is built. The Supreme Court further affirmed this legal position in 2021,¹⁸ providing additional support to recognise fantasy sports as skill-based games.

These landmark judgements ushered in a new era in India's legal understanding of online games of skill, laying the foundation for recognising and appreciating the role of skill within these platforms. The court's meticulous analysis underscores the intricate dimensions of skill, expertise, and training that form the crux of participant engagement in such games. Notably, the court's decision aligns with the principle that mastery of the game over time hinges on skill development and training, as opposed to games of chance that lack this inherent capacity. It also establishes that online games based on "mere skill" are not considered gambling, safeguarding games such as rummy and fantasy sports platforms.

3.2. Determining Games of Skill under Global Jurisdictions

The distinction between skill-based and chance-based games has been debated in jurisdictions worldwide. In the United States, the predominance test is commonly used, as exemplified in the *Dew-Becker v. Wu*¹⁹ case. The Illinois Supreme Court made a pivotal decision by endorsing the "predominant factor test" as a litmus test to determine the primary driving force behind the outcome of contests, particularly in daily fantasy sports. By adopting this test, the court delivered a verdict that aligns with the broader discourse on the interplay

¹⁵. Gurdeep Singh Sachar v. Union of India, (2019) 75 GST 258 (Bombay)

¹⁶. KR Lakshmanan v. State of Tamil Nadu, AIR 1996

¹⁷. Varun Gumber v. UT of Chandigarh, CWP No.7559 of 2017

¹⁸. Union of India v. Dream 11 Fantasy Sports, Miscellaneous Application 11445/2019

¹⁹. Dew-Becker v. Wu (2020 IL 124472) (USA)

between skill and chance in competitive activities. The Court analysed how the "predominant factor test" hinges on whether skill exerts more influence over the outcome of a contest than chance. This nuanced evaluation considers the intricate blend of factors contributing to the final result, acknowledging that participants' decisions, strategies, and abilities have a substantial impact on the outcome. Notably, the court considered several peer-reviewed studies that provided robust statistical evidence of skill's significant influence in daily fantasy sports. This recognition, supported by statistical evidence, reflects the broader shift towards recognising skill as a key determinant in various competitive pursuits, particularly those involving an element of chance.

Fantasy sports have been the subject of extensive litigation. In *People v. Fanduel, Inc.*,²⁰ real-money fantasy sports were initially prohibited in New York. However, in *White vs Cuomo*²¹, the Court of Appeals emphasised that contests should not be classified as "gambling" if their outcomes rely on the "skill and knowledge of the participants" rather than chance. The court highlighted that these contests do not constitute wagers on uncertain future events beyond the control or influence of the contestants. Instead, the outcome hinges on the relative skill of each participant, evaluated in comparison to one another.

Similarly, the Canadian Supreme Court, in the case of *Leo Ross v. Her Majesty the Queen*²², affirmed that in games like bridge, where skill significantly surpasses chance and chance merely serves as a coincidental and preliminary factor, should not fall under the classification of "a game of mixed chance and skill", thereby rendering it lawful. Furthermore, the Australian Magistrates Court, in *the Police v. Jones*²³ case, confirmed that poker involves skill and is not solely a game of chance. The court held that while an element of chance is indeed present in how cards are dealt, skill plays a significant role in shaping the game's outcome over an extended period. The decision emphasised that despite the variance introduced by chance in card distribution, the consistency and effectiveness of skilled decision-making become apparent over time. As a result, the outcomes tend to converge toward a pattern where the influence of skill becomes progressively dominant, steering the game's trajectory.

The judgments illustrated above shed light on the global jurisprudence surrounding skill-driven games. Spanning various jurisdictions and legal frameworks, these rulings are essential touchstones in the broader discourse on skill-based games.

3.3. Decluttering Indian Jurisprudence for Determining Skill-Based Online Games

The judicial examination of games and their classification as either skill-based or chance-driven has been a subject of significant importance, both globally and within the Indian legal framework. In making these determinations, courts have traditionally gravitated towards assessing the prevailing influence of either skill or chance within the mechanics of a given game. This pivotal distinction holds the power to render a game permissible or illegal within the bounds of the law. While case laws have emerged over time to shape the legal discourse around games, the absence of a standardised and empirical approach to support these judgments remains conspicuous. Nevertheless, certain recurring subjective parameters have emerged as common threads in these evolving legal perspectives:

- **Predominance of Skill:** In skill-based games, success depends on players' possession of advanced knowledge, extensive experience, and adeptness. Courts have emphasised that even though an element of chance may be present within such games, the predominance of skill surpasses chance's influence. The gameplay's dynamics are intricately woven with pivotal factors such as skill, astute judgement, accumulated experience, and rigorous training, collectively shaping the contours of success. The seminal case of *RMD Chamarbaugwala v. Union of India*²⁴ established the precedent for this principle, determining that while an element of chance was present in card games, the "skill of the player" played a significant role in determining the outcome. This case laid the foundation for the subsequent application of the principle in classifying online games.

²⁰ *State of New York. In People v. Fanduel, Inc.*, 2015 N.Y. Slip Op. 32332 (N.Y. Sup. Ct. 2015)

²¹ *White v. Cuomo*, 2022 NY Slip Op 01954 Decided on March 22, 2022 Court of Appeals: <https://law.justia.com/cases/new-york/court-of-appeals/2022/12.html>

²² *Leo Ross v. Her Majesty the Queen*, 1968 SCC Online Can SC 69

²³ *Police v. Jones*, [2008] SAMC 62

²⁴ *R. M. D. Chamarbaugwala v. The Union Of India*, AIR 1957

- **Persistence of Skill:** Skill-based games inherently allow for the improvement, refinement, and elevation of performance through sustained practice and experience over time. In contrast, games grounded solely in chance lack this potential for growth. This pivotal criterion serves as a guiding parameter, differentiating games where skill plays a defining role from those wherein chance prevails. The case of *Dr. K.R. Lakshmanan v. State of Tamil Nadu*²⁵ further reinforced this principle, recognising that skill-based games allow players to improve their performance through practice and skill development, unlike games of chance.
- **Skill Gradient:** Success in these games depends principally on the player's superior knowledge, training, attention, experience, and adroitness, even though the element of chance may not be entirely eliminated. The case of *Varun Gumber v. Union Territory of Chandigarh*²⁶ further strengthens the principle of skill gradient, highlighting the significance of skill in achieving success in online games. This case emphasises that while chance may be present, it does not negate the importance of skill in determining the outcome of a game. The principle of skill gradient emphasises the relationship between skill level and game outcomes, suggesting that players with higher skill levels are more likely to achieve better results than players with lower skill levels. These skill-centric attributes form the bedrock of success, it is noteworthy that these games may not completely eliminate the presence of chance. This fusion of skill and chance reflects the dynamic nature of these games, where the dominance of skill enhances the probabilities of favourable outcomes while acknowledging the inherent unpredictability that chance brings to ensure fairplay.

²⁵ AIR (1996) SC 1153 *Dr. K.R. Lakshmanan v. State of Tamil Nadu*

²⁶ *Varun Gumber v. UT of Chandigarh*, CWP No.7559 of 2017

4 | QUANTITATIVE PARAMETERS TO DETERMINE ONLINE GAMES OF SKILL

Specific quantitative methods have been developed to assess which online real money games qualify as games of skill, based on criteria derived from both Indian and international law. Furthermore, scientists have created objective evaluation methods using data and statistical models, which serve to complement these legal judgments.

The criteria outlined below, derived from both case law and empirical techniques, are designed to evaluate the role of skill versus chance in tested game formats. The criteria provide a qualitative and quantitative approach to support the contention that skill is the dominant factor in these games. Each criterion focusses on key aspects such as player skill variability in competition, the consistency of skill across games, skill improvement through experience, and the high level of proficiency required for exceptional performance. Together, these criteria provide a holistic evaluation, determining whether a game should be classified as skill-based or chance-driven.

Before delving into the specific tests, it is essential to thoroughly understand the key criteria that distinguish games of skill from games of chance. The interplay of these criteria, derived from existing case law and scientific methodologies, lays the groundwork on which the analysis of the games assessed is built. The detailed exploration of the criteria provides insight into the nuanced understanding that guide the classification of games, aiding in the comprehensive evaluation of online games.

4.1. Determining ‘Skill’ in Online Games

In online games, ‘skill’ refers to the player’s ability to significantly influence the game's outcome, in contrast to games of chance, where the result is beyond the player’s control and dependent on external random

factors. This distinction has been recognised by courts in India and globally through the use of the predominant test, which evaluates factors like skill, judgment, and discretion in determining whether a game is skill-based. This is significant for online games when an element of chance is involved in a given game.

In games of pure chance, where outcomes rely on time-independent random elements, a player’s past performance offers no predictive power for future success. Conversely, if past performance can reliably predict future outcomes, it strongly indicates that skill plays a crucial role in the game.²⁷ Thus, when statistically assessing whether a game involves skill, understanding the degree of skill involved becomes the essential first step.

From this, it can further be derived that a skilled player in a game of skill exhibits a win percentage that is significantly higher than chance allow. While an unskilled player may occasionally experience luck with a higher-than-average win percentage, over repeated play, luck evens out, and unskilled players revert to the average.²⁸ Statistically, we found that, with randomness, one can win up to 59 out of 100 trials with 95% confidence. However, this is only good for up to 100 games and thus can be used to disprove that the game is a game of pure chance and not for determining games of skill.

4.2. Concept of ‘Relative Skill’

The concept of ‘relative skill’ emerges from legal precedents and emphasises the comparison of players with varying skill sets. In addition to evaluating a player's individual skill, the effectiveness of skill in a game must also be measured relative to other players' skills. Over infinite number of game repetitions, each

²⁷ Peter Duersch Heidelberg/Mannheim Marco Lambrecht[†] Heidelberg Joerg Oechsler[‡] Heidelberg (2018 March 7th) Measuring skill and chance in games Retrieved from

https://www.uni-trier.de/fileadmin/fb4/prof/BWL/FIN/Veranstaltungen/duersch--Skill_and_chance_2018-03-07.pdf

²⁸ Michael Orkin (n.d.) Games of Chance and Games of Skill CHANCE Retrieved from

<https://chance.amstat.org/2021/11/games/>

player's outcome reflects their skill relative to their opponents, forming a skill gradient. This parameter of a *skill gradient* is a quantitative extension of judicial rulings, particularly in India, where courts have acknowledged that different skill levels are established based on the players' knowledge, training, attention, experience and adroitness without entirely eliminating the chance factor. In player-versus-player games, success depends on a player's relative skill compared to others. These skills encompass a range of factors, including calculating odds, psychological insights, assessing competition, and managing resources. The interplay of these skills determines the outcome, further reinforcing that success in such games is based on skill rather than pure chance.

4.3. Consistency of skill

Players can improve their skills through practice in a player-versus-player skill game, but no amount of practice can help in a chance-based game since success depends on external factors.²⁹ Judicial pronouncements have discussed the *persistence of skill*, which refers to the notion that a player's abilities, knowledge, and experience significantly impact their performance and success in the game. The more skilled a player becomes, the more likely they are to consistently achieve positive outcomes over time. This stands in contrast to chance-based games, where skill has no impact on the game's outcome.

4.4. Refinement of Skill

Moreover, through practice and experience, games of skill allow the players to acquire new strategies, enhance decision-making and improve their gameplay compared to when they first started on a platform.³⁰ Gaining *experience* allows them to refine their abilities and achieve better results over time. While individual games may still involve luck or unforeseen circumstances, skilled players are more likely to maintain a higher level of performance. This stems from their understanding of game mechanics and their ability to minimise the impact of random elements.

4.5. Superior Level of Skill

In online games of skill, highly skilled players consistently outperform weaker opponents, indicating a superior level of proficiency. If a game is truly a game of skill, we expect to observe a certain group of players on top of the chart among the playing population. However, in games of chance, where random factors dictate outcomes, no player can exhibit exemplary skill marked by consistent, exceptional performance. Even the most skilled player cannot consistently achieve better results than others. Statistically, performance in chance-based games aligns with the expected average outcomes determined by probability theory.

To holistically determine whether a game is predominantly skill-based, three tests were developed based on parameters identified from judicial pronouncements and quantitative criteria. These tests incorporate the previously explained principles derived from case law and overcome the limitations of subjective assessments. These must be fulfilled to empirically classify a game as one of skill, as explained in detail below-

- **Persistence of Skill:** To examine whether skill persists across periods, those with high success rates in one period will have high success rates in another non-overlapping period, and vice versa, in a game of skill. This test is designed to examine whether skill persists across multiple periods, and if it does, then those with high success rates in one period will have high success rates in another period and vice versa. Based on the logic, users who demonstrate high success rates in one period consistently maintain high success rates in subsequent periods. In contrast, in games of chance, success rates fluctuate randomly over time, lacking the consistent patterns seen in skill-based games.
- **Experience Gap:** To statistically examine the relationship between users' experience and their success rates. The Experience Gap Test measures the correlation between success rates and experience differences between opponents. It

²⁹ Rogier J. D. Potter van Loon¹, Martijn J. van den Assem², Dennie van Dolder (2015 March 2nd) Beyond Chance? The Persistence of Performance in Online Poker PLOS Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4346402/pdf/pone.0115479.pdf>

³⁰ Nandan Kamath (2022 September 15th) Games of Skill Vs Games of Chance - A Principles-Based Framework to Recognise the Difference LawInSport Retrieved from <https://www.lawinsport.com/topics/item/games-of-skill-vs-games-of-chance-a-principle-based-framework-to-recognise-the-difference>

evaluates whether players with more experience consistently achieve higher success rates compared to less experienced opponents. In skill-based games, a larger experience gap typically leads to more frequent favourable outcomes for the experienced player. Conversely, in chance-based games, this correlation would be absent, as outcomes are random and not influenced by player experience.

- **Exemplary Skill:** Examine whether a segment of players demonstrates an exemplary skill set among multiple users and their levels. The presence of a few highly skilled individuals who outperform others indicates the existence of a skill-based element within the game. This test helped to identify the top performers and distinguish skill-based games, where exceptional skill levels significantly contribute to success, unlike chance-based games.

To evaluate the user data and measure skill in the game, each test was performed using two different approaches. Initially, the Chi-Square test, a hypothesis testing method, was used to understand the association between two attributes. If the result was insignificant, no further analysis was conducted. In cases where significance was found, the Pearson Correlation test was then used to determine the presence of skill in the game.

4.6. Procedure

We selected the tests that specifically address the key aspects distinguishing skill-based games from chance-based games, including persistence of skill, experience gap, and exemplary skill. We analysed each test to examine the factors crucial for differentiating the influence of skill from chance in a game. We conducted statistical analyses on the data from these tests to assess whether each game met the minimum common denominator required to be classified as a game of skill. These tests provided us with quantitative evidence of presence of skill in the game. Our analysis allowed us to develop a standardised and quantifiable approach for evaluating the skill component of each game and accurately determining its classification.

The following are the minimum common denominators for each test that we used to assess the predominance of skill in the games:

- i. For the persistence of skill:

a. Chi-Square Test: The data result should reflect a **statistically significant association** (p -value < 0.05) between success metrics in two distinct, non-overlapping time periods to satisfy this test.

b. Pearson Correlation Coefficient: A skill-based game would exhibit a **statistically significant positive correlation** (p -value < 0.05), indicating that players with higher success rates in one period tend to have higher success rates in the other.

- ii. To determine the experience level:

a. Chi-Square Test: A p -value less than 0.05 ($p < 0.05$) will indicate a **statistically significant correlation** in a skill-based game.

b. Pearson Correlation Coefficient: The skill level (as measured by success rate) should increase as users play more games. For this test to pass, a **statistically significant correlation** should be observed between the delta of the users' experience and the success rate. Thus, success rate and experience will be correlated.

- iii. Exemplary skill refers to the extraordinary performance demonstrated by a specific set of players in a spectrum of skill sets. While specific statistical indicators may differ between different types of games, the exemplary skill will be reflected through **consistently outstanding results**.

The Chi-square test serves as a preliminary tool to help establish an initial understanding of whether the association between variables is significant. If the Chi-square test does not reveal a significant association, no further statistical analysis is required. However, if the test shows a significant association, we then use the Pearson correlation method to further refine the understanding. The Pearson correlation test helps determine if there is a positive correlation, which is characteristic of a game of skill. This two-step approach provided a more comprehensive picture of the relationship between user skill and success rate across different game formats.

4.7. Application of Tests

We applied these tests to actual user data from various online games to measure skill independent of random factors or chance. Statistical comparisons enable the evaluation of players across the skill spectrum and determine their performance relative to the broader gaming community. The outcomes depicted (refer to Annexure-1) showcase the degree to which games are skill-based rather than influenced by random factors or “chance”.

4.7.1 Test 1: Persistence of Skill

This method quantifies a player's consistent skill presence. This will be reflected through higher success rates in online games of skill by examining the consistency of performance across two time periods. The test demonstrates that those with high success rates in one period have high success rates in another period and vice versa. For this, we look at the distribution of underlying skill across different games played over a span of two periods and analyse whether a player's success rate in the first period correlates with their success rate in the second.

To conduct this test, we first applied the Chi-Square association method to compare success rates in the two periods and checked if the p -value < 0.05 . This method assesses the association between two variables. It evaluated whether user success rates from two distinct periods are related by comparing the observed data distribution with what would be expected if there were no association.

The p -value refers to the probability of observing a result as extreme as the one calculated, assuming the null hypothesis is true—that there is no significant association between the two variables. In the context of the persistence of skill test, the null hypothesis refers to no association between success rates in the two time periods.

If the p -value is extremely close to zero in the data distribution, the association between the two variables is improbable due to chance. In a game of skill, the test results would indicate a strong association between

the success rates of the two time periods. Users with high success rates in one time period are likely to demonstrate high success rates, if not higher, in another period.

After the chi-square test validated the presence of skill in the game, we employed the Pearson correlation method to further explore this preliminary association. This method demonstrates that those with high success rates in one period have high success rates in another period and vice versa. For this, we look at the game's underlying skill distribution over two time periods and analyse whether a player's win fraction in the first correlates with their win fraction in the second period.

For example, consider a test conducted on users who play a significant number of games across two periods. We measured the correlation between their success rates in these two periods. If the correlation is both positive and statistically significant, we can state that there is persistence of skill in that game. Suppose the data depicts a positive correlation between the winning ratio and the number of games played. In that case, as a player engages in a greater number of games over a period of time, their overall gameplay improves. **The significantly positive slope reflects the persistence of skill in online games, which helps categorise these games as games of skill** (refer to Annexure-1).

In games of chance, there is no persistence or correlation in performance over different periods.³¹ Skill level or experience does not affect the chances of winning or losing, as outcomes depend solely on luck. Short-term patterns observed in individual results are merely statistical fluctuations and do not indicate skill persistence. Games of chance, even if they incorporate elements of skill, are primarily determined by random factors. For example, lottery games involve randomly drawn numbers, and neither strategies or number selection can alter the random results.

4.7.2 Test 2: Experience Gap

This test suggests the relationship between user experience and success rate by measuring the correlation between success rates and the experience difference between opponents. In a skill-based game, players with significantly more experience – who are

³¹ Rogier J. D. Potter van Loon¹, Martijn J. van den Assem, Dennie van Dolder (2015 March 2nd) *Beyond Chance? The Persistence of Performance in Online Poker* PLOS Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4346402/pdf/pone.0115479.pdf>

presumably more skilled should consistently achieve higher success rates compared to less experienced players.

In a skill-based game, an increasing experience gap between two should correlate with more frequent wins for the more experienced player. This is because their higher experience translates into better strategies, decision-making, and overall performance. Conversely, such a correlation would not be present in a game of chance, as outcomes are random and not influenced by player experience.

The experience gap test clearly indicates whether skill is a dominant factor in a game's outcomes. By comparing success rates between players with varying levels of experience, it becomes evident that more experienced players consistently outperform less experienced ones. This consistency in higher success rates for more experienced players strongly indicates the game's skill-based nature. Conversely, if no significant correlation is found, then the game's outcomes are primarily governed by chance.

Additionally, this test is a valuable tool for assessing skill development and improvement in gameplay, even among experienced players. While prior knowledge and strategies from offline play may provide an initial advantage, players must still adapt to the unique dynamics, nuances, and rules of online platforms. Factors such as varying user interfaces, gameplay variations, and interaction with other players can impact the performance of even the most skilled players.

To statistically measure this, the association and correlation between success rates and the experience difference between opponents was calculated. A positive and statistically significant correlation indicates that more experienced players consistently achieve higher success rates compared to less experienced players. In other words, if players with significantly greater experience win more often than their less experienced counterparts, it suggests that experience and skill play a significant role in determining the game's outcomes.

The chi-square association test for mean skill delta and mean of success metric was performed to check if the p value < 0.05 . The chi-square method here assesses

the association between the two variables - the difference in user experience (skill delta) and the average success rate among a specific group of users (slabs). The null hypothesis will be that there is no association between user experience and success rate.

The p -value, which is extremely close to zero, indicates that the statistical association observed between the mean skill delta and the mean success rate among the specific user groups is highly unlikely to be random. However, it is pertinent to note that there is a more nuanced understanding of this relationship than just the individual experience and success rate. The test demonstrates that the users with more experience tend to have higher success rates, which aligns with the idea that experience can contribute to better performance. But, as the overall user base gains experience, the average success rate may not increase proportionally. This is so because factors, such as users encountering opponents with varying skill levels across experience slabs, may impact the overall average success rate.

In a game of skill, the chi-square test establishes the existence of an association between experience and success rate. However, the directionality of this association is not established. The Pearson correlation test will analyse the association further.

The data preparation for The Pearson correlation test involved creating slabs of different experience deltas, ensuring a similar number of entries per slab. The mean experience delta and mean success metric were computed within each slab. The Pearson correlation coefficient was then calculated to determine if it was significantly greater than 0 at a p -value less than 0.05. A positive and statistically significant correlation would indicate that users with more experience relative to their opponents tend to have higher success rates.

This result supports the notion that skill, as represented by experience, plays a significant role in determining the outcomes of the game. It contrasts with games of chance, where outcomes are random and not influenced by player experience. Understanding this correlation helps assess the extent to which skill influences the game's outcomes, thereby informing debates on whether the game should be classified as a game of skill or chance.

4.7.3 Test 3: Exemplary Skill

Exemplary skill refers to the extraordinary performance demonstrated by a certain set of players in a spectrum of skill sets. While specific statistical indicators may differ between different types of games, the exemplary skill will be reflected through consistently outstanding results. To illustrate this, the number of trials needed to get one success (to be interpreted as someone getting at least 70 wins in 100 independent attempts with probability of win = 1/2 in each attempt) in this situation follows a geometric distribution whose expected value is known to be $1/[\text{probability of getting 70 or more successes in Binomial distribution } (100, 1/2)]$.

Hence,

- The expected probability of achieving at least 70 wins out of 100 trials ($P(X \geq 70)$) is calculated as $1 - \text{binom.dist}(69, 100, 0.5, \text{true})$, which equals approximately 0.000039251.
- Therefore, the expected number of trials needed to achieve one favorable event (at least 70 wins in 100 trials) in a pure game of chance (such as a coin toss) is given by $1/P(X \geq 70)$.
- This results in an expected number of trials of approximately 25,477 to achieve one event of at least 70 wins out of 100 games.

It is important to note that this is an expected value, meaning that, on average, approximately 25,477 trials are required to observe at least 70 wins in 100 trials once. However, due to the inherent randomness of the process, the actual number of trials needed can vary. This highlights the rarity and statistical significance of exemplary skill in games of chance. Understanding this rarity emphasises the importance of considering such factors when evaluating and distinguishing skill-based games from games of chance.

To generalise this for n games with k wins, the probability of getting at least k wins can be denoted by:

$$P(X \geq k) = 1 - \text{binom.dist}(k-1, n, .5, \text{true}).$$

$$xxx = 1/P(X \geq k)$$

No. of users in (1 in 1 trillion) will the users for whom the value of $xxx \geq 1$ trillion

If there are a significant number of users in (1 in 1 trillion), (1 in 1 billion) and (1 in 1 million), we can say that

there are certain users that exhibit exemplary skill level in the game.

Since here, 1vs1 game was considered, the probability of winning in a game of chance = 0.5.

The table in Annexure-1 (exemplary test results) analysed user success rates and other performance metrics to identify highly skilled users in a particular game. These users have a consistently high success rate, indicating that their performance is not simply due to luck. By comparing the distribution of success rates among users in a particular game to the distribution expected to see in a game of chance, it can quantifiably be demonstrated whether the game is primarily a game of skill or a game of chance. If a game is a game of skill, there will be a certain set of highly skilled users who, thus, should be able to achieve a very high success rate.

For this test, a random sample of users who had each played at least 100 games was considered. The percentage of these users with p-value equivalent to a 1 in 1 million chance of achieving their success rate was the identified (tied games were ignored for this test and only included win or loss).

5 | FRAMEWORK TO DETERMINE GAMES OF SKILL

Determining games of skill from games of chance has been a complex endeavour for countries across the globe. In India, the amended IT Rules gave a much-required direction by laying out the core principles to determine permissible games, outcomes do not amount to wagering. According to these rules, SRBs are required to develop a charter to verify online real money games.

global methodologies—offers a comprehensive and objective approach to assessing whether online games qualify as permissible skill-based games. The tests in this framework are interoperable across various types of games.

The following chart illustrates the framework and the key trends that should be followed to determine games of skill:

The framework presented in this study – grounded in case law precedents and based on an analysis of

S.no	Test	Description	Method	Trend
Data-Based				
1.	Persistence of Skill	To determine if skill persists across two or more time periods.	<ol style="list-style-type: none"> a. Take users who have played a significant number of games in two different time periods. b. Calculate the chi-square association for different success rates in the two time periods to check if the p-value < 0.05. c. Following the association's establishment, calculate the correlation coefficient for the success rates in the same two periods. 	<p><i>Games of Skill:</i> In a skill-based game, the data distribution will demonstrate that user success rates from two distinct periods are related (p-value < 0.05). Once the presence of skill is established, if the Pearson correlation coefficient across two distinct time periods is positive and statistically significant, we can state that there is a persistence of skill in that game. The results will demonstrate a statistically positive slope.</p> <p><i>Games of Chance:</i> If the p-value is not</p>

S.no	Test	Description	Method	Trend
				<p>close to zero, it would indicate a lack of association between the user success rates in the two time periods, thereby supporting the null hypothesis that the game is based on chance. This would indicate no presence of skill due to the lack of association between the user success rates in the two time periods, proving the null hypothesis. Thus, further testing under the Pearson correlation coefficient would not be required as it would only reflect that the two time periods do not match and are independent in a game of chance.</p>
2.	Experience Gap	To determine if players with more experience than their opponents have higher success rates.	<ol style="list-style-type: none"> a. Take users who qualify the criteria of having played ≥ 100 games. b. Calculate the chi-square association test for mean skill delta and mean of success metric. c. Following a significant association between the two variables, calculate the correlation between mean skill delta and mean of success metric. 	<p><i>Games of Skill:</i> If the association between user experience and success rate are identified under the chi-square test, then it can be said there is a presence of skill. Upon further testing through Pearson Correlation method, if the correlation is positive and statistically significant between success rate and experience then it is a game of skill. This test will require a positive and statistically significant correlation for a game of skill.</p>

S.no	Test	Description	Method	Trend
				<p><i>Games of Chance:</i> If the chi-square method demonstration no association between the variables and shows minimal growth or fluctuates under pearson correlation method, it is a game of chance.</p>
3.	Exemplary Skill	To determine a set of players that demonstrate extraordinary performance in a spectrum of skill sets.	<p>a. Take a random sample of users who have each played at least a 100 games.</p> <p>b. Calculate the percentage of these users having a p-value that translates to 1 in 1 million chance of achieving that success rate.</p> <p>c. If there are fewer than ten thousand users, consider all eligible users for the test.</p> <p>Do not consider tied games for this test and only include win or loss.</p>	<p><i>Games of Skill:</i> If there are a significant number of users in (1 in 1 trillion), (1 in 1 billion) and (1 in 1 million), it can be derived that there are certain users that exhibit exemplary skill level in the game. Thus, it is a game of skill.</p> <p><i>Games of Chance:</i> A game of chance will not have a significant set of users that demonstrate exemplary skill rate through a positive success rate.</p>

A few additional variables need to be considered while performing the above tests:

1. The game's conclusion cannot be based on a chance element, e.g. Tie breakers cannot be a chance element.
2. Any outcome of the given game should not be based on the outcome of a singular event.
3. There should be no significant first-mover advantage or disadvantage.
4. There should be parity/equal opportunity for all players over a statistically significant set of events.
5. The game should provide sufficient time for the users to strategise the game choices in terms of duration and per move.
6. Third-party certifications should be obtained for Random Number Generators if used in cases of lack of enough data available to validate the simulation-based analysis of the tests.
7. Third-party certification should be obtained to ascertain that no bot is used in the gameplay against the players.

Below are the broad pillars of the comprehensive simulation and data-based evaluation of the online games:

- A. Statistical Analysis:** The tests performed on the data must confirm that the player's skill must significantly influence game outcomes. Skilled players will consistently outperform less skilled players across metrics, such as success rates and scores. The observed distribution of outcomes should align with expectations based on skill, rather than chance alone.

- B. Skill-Based Analysis:** Through data analysis, a strong correlation must be observed between player skill level and performance in the games. Skilled players will consistently achieve better outcomes than less skilled players in a game of skill. The skill-based games will exhibit a certain degree of complexity, requiring strategic decision-making, problem-solving, and critical thinking to succeed.

ANNEXURE - 1

TEST RESULTS OF GAMING FORMATS

Persistence of Skill Test

In the table below, the chi-square association method was performed for different success rates in two time

periods to check if the p-value < 0.05. The analysis of the test results indicates a strong association between the success rates of the two time periods, hence validating that there is presence of skill in the games.

Game Type	Chi-Sq Stat	P-value	Sample size
Ludo	10365.42486	0	5000
Fantasy Sports	13080.55831	0	4000
Poker	11850	0	10000

Online Rummy		
Game Type	Chi-Sq Stat	P-value
Points-6p (Success Metric: Win Rate when played)	12,105.12	0.0
Points-2p (Success Metric: Win Rate whenplayed)	4,411.23	0.0
Pool-6p (Success Metric: Win Rate)	36,195.86	0.0
Pool-2p (Success Metric: Win Rate)	13,660.59	0.0
Deal-6p (Success Metric: Win Rate)	500.92	0.0
Deal-2p (Success Metric: Win Rate)	15,453.87	0.0

Table 1 : Chi-Square Association between success rate of two time periods

Furthermore, an analysis of the data represented below clearly states that the win ratio increases as users engage games over a while. The data depicts a positive correlation between the winning ratio to the number of games played, concluding that as a player

engages in a greater number of games over a period of time, their overall gameplay improves. The significantly positive slope reflects the persistence of skill in the online games listed above, which helps categorise these games as games of skill.

Game Type	Correlation	P-value	Sample size
Ludo	0.373156485	0.0	4000
Fantasy Sports	0.651217984	0.0	10000
Poker	0.086784649	0.0	10000

Online Rummy		
Game Type	Chi-Sq Stat	P-value
Points-6p	0.6747894781	0.0
Points-2p	0.7341515769	0.0
Pool-6p	0.5189831791	0.0
Pool-2p	0.4847289169	0.0
Deal-6p	0.2039227907	0.0
Deal-2p	0.3327944903	0.0

Table 2: Pearson correlation between success rate of two time periods

Experience Gap Test

The test results below indicate that the statistical association observed between the mean skill delta and the mean success rate among the specific user groups

is not random. The test demonstrates that the users with more experience than opponents tend to have higher success rates, which aligns with the idea that experience can contribute to better performance.

Game Type	Chi-Sq Stat	P-value	Sample size
Ludo	335.7581953	0.0	50000
Fantasy Sports	427.4480531	0.0	50000
Poker	6584.77914	0.0	50000

Online Rummy		
Game Type	Chi-Sq Stat	P-value
Points-6p (Win Rate when played)	337,567.85	0.0
Points-2p (Win Rate when played)	553,971.04	0.0
Pool-6p (Win Rate)	1,550,138.53	0.0
Pool-2p (Win Rate)	926,135.00	0.0
Deal-6p (Win Rate)	293,030.81	0.0
Deal-2p (Win Rate)	1,875,443.81	0.0

Table 3 : Chi-Square Association between mean skill delta and the mean success rate

Upon further analysis using the Pearson correlation, the table below maps a statistically significant correlation between the experience gap (i.e., the difference in experience between two opponents) and game success rate. The correlation demonstrates that

users with more experience than their opponents have a higher success rate, indicating that experience—and by extension, skill—plays a crucial role in determining the game's outcomes.

Game Type	Correlation	P-value	Sample size
Ludo	0.373156485	0.0	4000
Fantasy Sports	0.801585505	0.0	1000000
Poker	0.306610304	0.0	4500000

Online Rummy		
Game Type	Correlation Coefficient	P-value
Points-6p (Win Rate when played)	0.88	0.0
Points-2p (Win Rate when played)	0.82	0.0
Pool-6p (Win Rate)	0.85	0.0
Pool-2p (Win Rate)	0.91	0.0
Deal-6p (Win Rate)	0.89	0.0
Deal-2p (Win Rate)	0.93	0.0

Table 4 : Pearson correlation between mean skill delta and mean of success metric

Exemplary Skill Test

In the table below, user success rates and other performance metrics were analysed to identify highly skilled users in a particular game. These users may have a consistently high success rate, indicating that their performance is not simply due to luck. By comparing the distribution of success rates among users in a particular game to the distribution expected to see in a game of chance, it can quantifiably be demonstrated whether the game is primarily a game of

skill or a game of chance. If a game is a game of skill, there will be a certain set of highly skilled users who thus should be able to achieve a very high success rate.

The test is based on the proposition that if there are a significant number of users i.e. one in one trillion, **one in one billion and one in one million, we can say that there are certain users that exhibit exemplary skill levels** in the game, proving that it is thus a game of skill.

Game Type	z-stat	P-value	Sample size
Ludo	11.72420764	0.0	10000
Fantasy Sports	15.31118005	3.22E-53	3000
Poker	47.89504259	0	5000

Online Rummy			
Game Type	Proportion of Players	z-statistic	P-value
Points-2p (Win Rate when played >= x%)	37.24%	70.48	0.0
Pool-2p (Win Rate >= x%)	10.33%	24.65	0.0
Deal-2p (Win Rate >= x%)	5.59%	9.24	0.0
Points-6p (Win rate when Played >= y%)	80.65%	181.0905	0.0
Pool-6p (Win rate >= y%)	81.74%	196.57022	0.0
Deal-6p (Win rate >= y%)	8.39%	19.421375	0.0

Table 5 : Exemplary Skill



thedialogue.co



[@_DialogueIndia](https://twitter.com/_DialogueIndia)



[@TheDialogue_Official](https://www.instagram.com/TheDialogue_Official)



[@The-Dialogue-India](https://www.linkedin.com/company/The-Dialogue-India)



[@TheDialogueIndia](https://www.facebook.com/TheDialogueIndia)