Evaluation of Integra-Quest: A Numeracy Adventure as an Enrichment for Integer Competency

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ABSTRACT

This study examined *Integra-Quest: A Numeracy Adventure* as an enrichment tool for developing integer competency among Grade 7 learners in a distant national secondary institution in Iloilo. Using a design-based research approach, both quantitative and qualitative data were collected from 33 learners and five expert evaluators. Learners completed pretest and posttest assessments, while experts provided structured evaluations of the tool's content, instructional quality, technical quality, presentation, and up-to-datedness.

Findings revealed that experts unanimously rated the manipulative as *highly acceptable* in terms of content (M = 3.96, SD = 0.09), instructional quality (M = 3.72, SD = 0.38), technical quality (M = 3.52, SD = 0.65), and up-to-datedness (M = 3.60, SD = 0.46), with presentation and organization rated *acceptable* (M = 3.28, SD = 0.44). Learners' evaluation likewise indicated *acceptable* ratings across all categories, including content (M = 3.46), instructional quality (M = 3.37), usability (M = 3.26), presentation (M = 3.49), and design (M = 3.37). Qualitative feedback highlighted increased engagement, enjoyment, and confidence in handling integer operations.

Overall, the study concludes that *Integra-Quest* is a pedagogically sound and effective intervention for numeracy development. Continuous refinement, particularly in presentation and organization, alongside sustained expert and learner feedback, will ensure its relevance and effectiveness in mathematics education.

Keywords: Integra-Quest: A Numeracy Adventure, game-based learning, instructional manipulatives, and numeracy.

INTRODUCTION

Mathematics instruction often leans heavily on procedural fluency, leaving students disengaged when abstract concepts such as integer operations lack real-world context or dynamic interaction (Boaler, 2016). These gaps are especially pronounced in middle school learners who struggle with sign rules, subtraction across zero, and the conceptual meaning of negative numbers (Suryawati & Osman, 2018).

Recent trends in educational research emphasize the value of enrichment tools—particularly those rooted in game-based learning—as a means to deepen understanding and increase motivation (Plass, Homer, & Kinzer, 2015; Kapp, 2012). *Integra-Quest: A Numeracy Adventure* was designed to respond to this need by merging mathematical rigor with imaginative gameplay, providing learners with opportunities to practice integer operations in a way that is both fun and cognitively stimulating.

This evaluation is grounded in the belief that contextualized and engaging activities can support mathematical growth while fostering a sense of agency and enjoyment (Adipat et al., 2021). By analyzing both performance outcomes and learner perceptions, the study seeks to contribute insights into the utility of game-based enrichment within a structured curriculum, reinforcing the shift from passive reception to active exploration in mathematics learning.

In the evolving landscape of mathematics education, educators continually seek innovative approaches to enhance students' foundational skills. One critical area of concern is the development of integer competency,

which serves as a gateway to more complex mathematical concepts (National Council of Teachers of Mathematics [NCTM], 2020). Despite its fundamental nature, many students exhibit persistent misconceptions and limited mastery of integer operations, often leading to reduced confidence and academic performance (Suryawati & Osman, 2018).

To address this challenge, game-based learning has emerged as a promising strategy, providing an interactive and motivating platform for mathematical engagement (Plass et al., 2015; Kula, 2021). *Integra-Quest: A Numeracy Adventure*, designed to reinforce integer operations through an immersive, quest-driven format, represents a novel enrichment tool aimed at bridging conceptual gaps while fostering positive learning experiences.

This study evaluates the effectiveness of *Integra-Quest* in improving students' competency with integers, examining both quantitative outcomes and qualitative feedback. By assessing its impact on performance and engagement, the research aims to contribute practical insights into the integration of gamified instruction within formal mathematics curricula. Moreover, it explores how contextualized and hands-on learning tools can support diverse learners and complement traditional pedagogical methods (Suryawati & Osman, 2018; Adipat et al., 2021).

The study aims to evaluate *Integra-Quest*: A Numeracy Adventure as an intervention for Numeracy:

1. To determine learners' and experts' evaluations of *Integra-Quest*: A Numeracy Adventure as an intervention for Numeracy terms of:

    a. Content
    b. Instructional quality
    c. Technical quality
    d. Presentation and organization
    e. Accuracy and up-to-datedness of information

2. To determine the learners' experience using the Integra-Quest; A Numeracy Adventure as an intervention for Numeracy.

Integer operations form a foundational component of mathematical fluency, yet students often struggle with conceptual understanding—particularly with sign rules, zero subtraction, and negative number interpretation. Suryawati and Osman (2018) emphasized that abstract instruction without contextual grounding contributes to persistent misconceptions and disengagement. Their findings support the need for instructional strategies that connect mathematical concepts to real-life scenarios, especially for middle school learners.

Game-based learning has gained traction as a pedagogical approach that enhances motivation, engagement, and retention. Plass, Homer, and Kinzer (2015) argued that effective educational games must integrate cognitive, motivational, affective, and sociocultural elements to foster deep learning. Similarly, Kapp (2012) highlighted that gamification strategies such as feedback loops, level progression, and narrative immersion—can transform passive learners into active participants. These principles are embedded in *Integra-Quest*, which uses quest-driven gameplay to reinforce mathematical rigor.

Contextualized learning, as defined by Suryawati and Osman (2018), involves embedding academic content within meaningful, real-world contexts to improve comprehension and performance. This approach aligns with experiential learning theory, which posits that students learn best through active engagement and reflection. *Integra-Quest* leverages this by presenting integer problems within story-based adventures, allowing learners to apply concepts in simulated environments that mirror real-life decision-making.

Adipat et al. (2021) found that game-based learning environments significantly improve student engagement and foster a sense of agency. Their study emphasized the importance of interactive design and learner autonomy in sustaining motivation. In the context of *Integra-Quest*, feedback mechanisms and adaptive challenges are designed to support learners at varying proficiency levels, encouraging persistence and self-directed learning.

The National Council of Teachers of Mathematics (NCTM, 2020) advocates for the integration of enrichment tools that promote mathematical reasoning and problem-solving. By evaluating *Integra-Quest* through both performance metrics and learner perceptions, this study contributes to the growing body of evidence supporting the inclusion of gamified instruction in formal curricula. It also offers practical recommendations for educators seeking to enhance integer competency through innovative, student-centered approaches.

Significance of the Study

The findings of the study are envisioned to be of great help to the following:

Learners

Learners, especially those who struggle with numeracy abilities, will immediately benefit from the instructional materials generated through this project. Learners can increase their mathematical ability and, consequently, their overall academic performance and confidence in the subject by being given specialized tools and methodologies.

Teachers

The results of this study can help teachers in a variety of educational settings. Teachers can improve their teaching tactics and create inclusive learning environments that support learners' achievement in mathematics by implementing evidence-based instructional approaches that are customized to meet the requirements of non-numerate kids.

School Administrator

The management of the school, especially the principal, benefits from the study's success. The school's overall academic success and reputation are enhanced by improved student outcomes and teacher performance, which emphasizes good leadership and instructional strategies.

Department of Education (DepEd)

The outcome of this study may serve as baseline information or a criterion in planning and developing teachers' awareness as regards the assessments of non- numerate learners and how they can attain a better performance through it. It may also improve the teacher's teaching process and may result in exemplary school performance. By understanding how instructional materials can facilitate better performance in mathematics, DepEd can refine its curriculum and training programs, leading to improved educational outcomes at both individual and institutional levels.

Other Researchers

For those doing research on related subjects in the future, this paper can serve as a useful resource. Further research initiatives can further improve understanding of the topic by delving deeper into the intricacies of educational interventions for non- numerate learners, building upon the approaches and insights provided here.

METHODOLOGY

Research Design

This research employs a design-based research approach to investigate learners' competencies in integers towards the development of mathematical manipulatives. By integrating both qualitative and quantitative methods, this study aims to provide a comprehensive analysis of their performance on operation of integers. The methodology is structured into three primary phases: research respondents, data gathering instrument, data gathering and data analysis procedure.

Respondent

This study involved all Grade 7 learners officially enrolled in one of the A distant national secondary institution in Iloilo. The research focused on addressing the challenges faced by these learners in mastering the four fundamental operations of integers: addition, subtraction, multiplication, and division. Utilizing a design-based research approach, the study evaluated the Integra-Quest: A Numeracy Adventure, tailored to the needs of the learners. In addition, five experts in mathematics instruction and instructional design were invited to evaluate the Integra-Quest manipulative, providing professional insights into its content, instructional quality, technical quality, presentation, and up-to-datedness.

One important limitation of this study is the relatively small and localized sample, consisting of 33 Grade 7 learners from a distant national secondary school in Iloilo. While the findings provide valuable insights into learner engagement and the pedagogical potential of *Integra-Quest: A Numeracy Adventure*, the restricted sample size limits the generalizability of the results to broader educational contexts. The experiences and evaluations of this specific group may not fully represent the diversity of learners across different regions, school types, or grade levels. This limitation underscores the need for caution in interpreting the results as universally applicable.

Data Analysis Procedure

Frequency involved counting the number of occurrences of each value in a dataset. It helped in understanding the distribution of data points and identifying common or rare values. In this study, it was used to determine the number of learners who took part throughout the duration of the study.

Mean, a measure of central tendency, provided an overall summary of the data by dividing the sum of all values by the number of values. It offered insight into the general level of the data points. In this study, it was used to determine the level of learners' performance before and after the intervention.

Standard Deviation, a statistical measure, indicated the amount of variation or dispersion within a set of values. A low standard deviation meant that the values were close to the mean, whereas a high standard deviation indicated a wider range of values. In this study, the standard deviation was used to determine the average difference in learners' performance before and after the intervention.

Functional Narrative Analysis, the learners participated in a written interview designed to gather insights into their experiences and challenges during the enhancement activities with Integra-Quest: A Numeracy Adventure. The interview aimed to assess how effectively the manipulative engaged students, supported their understanding of integer operations, and addressed any difficulties they encountered. By reflecting on their learning process, students provided valuable feedback on aspects such as problem-solving strategies, ease of use, enjoyment, and areas where they faced obstacles. This qualitative data enabled the researcher to evaluate the manipulative's impact and identify potential improvements to optimize its effectiveness in mathematics instruction.

In this study, thematic coding was employed to systematically analyze qualitative data and uncover meaningful insights or patterns. Thematic analysis involves identifying, analyzing, and reporting patterns or themes within qualitative data. Braun and Clarke (2006) emphasized that thematic analysis is a foundational method of qualitative research that must be clearly defined and described to establish its role in qualitative inquiry.

As a foundational method in qualitative research, thematic analysis allows researchers to uncover patterns and themes within their data. Braun and Clarke (2023) developed a widely accepted framework providing a structured approach to identifying, analyzing, and interpreting themes. Their six-phase process ensures rigor and transparency in thematic analysis, making it an invaluable tool across various disciplines. Here's a brief overview of their approach:

1. Familiarization with the data – Immersing oneself in the dataset by reading and re-reading.
2. Generating initial codes – Identifying meaningful segments within the data.
3. Searching for themes – Organizing codes into broader thematic categories.

4. Reviewing themes – Refining themes to ensure coherence and relevance.
5. Defining and naming themes – Clearly articulating each theme's significance.
6. Producing the report – Presenting a detailed analysis that integrates themes with supporting data.

This procedure was conducted after the evaluation took place and once the data had been categorized. The researcher employed this process to provide a thorough and accurate portrayal of learners' viewpoints. The process began with gathering qualitative data, followed by arranging and coding it, ultimately leading to the development of themes that explained key concepts.

RESULTS, ANALYSIS AND DISCUSSIONS

Experts' Evaluation of Integra-Quest: A Numeracy Adventure

The results from such a detailed evaluation can guide further development and refinement of the educational tools, ensuring they meet high standards of quality and effectiveness. Moreover, the process highlights the importance of expert feedback in the creation and enhancement of educational materials, ultimately contributing to better learning outcomes for students (Mazo, 2020). By continuously incorporating expert evaluations, The Integra-Quest: A Numeracy Adventure can adapt and improve, staying relevant and effective in the evolving educational landscape (Li & Kaiser, 2010).

Moreover, the evaluation of The Integra-Quest: A Numeracy Adventure was conducted by five experts in mathematics instruction, each holding a Doctor of Philosophy degree with a specialization in instructional design and the use of manipulatives in teaching. These experts provided a thorough assessment of the material's content, pedagogical effectiveness, and alignment with best practices in mathematics education.

Table 1 presents the experts' evaluation. Findings indicate that all experts unanimously rated The Integra-Quest: A Numeracy Adventure as "highly acceptable" in terms of content ($M = 3.96$, $SD = 0.09$). This suggests that the manipulative exceeds the expectations of the experts.

The unanimous high ratings from experts highlight the strong content quality of The Integra-Quest: A Numeracy Adventure. According to Velasco et al. (2023), expert evaluations are crucial in ensuring that educational tools meet the highest standards of quality. The experts' unanimous agreement on the manipulative's content quality indicates that it is well-designed and effective in delivering educational value. This alignment among experts underscores the reliability and validity of the evaluation process.

The positive feedback from experts can guide further development and refinement of the educational tools, ensuring they continue to meet and exceed expectations. By consistently incorporating expert evaluations, The Integra-Quest: A Numeracy Adventure can maintain its relevance and effectiveness in the evolving educational landscape, ultimately contributing to better learning outcomes for learners.

The evaluation of The Integra-Quest: A Numeracy Adventure extended beyond content to cover other critical aspects: instructional quality ($M = 3.72$, $SD = 0.38$), technical quality ($M = 3.52$, $SD = 0.65$), presentation and organization ($M = 3.28$, $SD = 0.44$), and up-to-datedness of information ($M = 3.60$, $SD = 0.46$). All experts unanimously rated the manipulative as highly acceptable in terms of content, instructional quality, technical quality, and up-to-datedness of information, while in presentation and organization, experts rated it as acceptable.

The high ratings across these diverse criteria underscore the comprehensive strengths of The Integra-Quest: A Numeracy Adventure. According to DepEd Pines (2015), the instructional quality of educational tools is pivotal to their effectiveness. The manipulative's high rating in this area suggests that it not only meets but exceeds educational standards, offering robust support for learning processes.

Technical quality, as highlighted by Mazo (2020), is another crucial factor that affects the usability and reliability of educational tools. The high rating in this category indicates that the manipulative is well-constructed, durable, and user-friendly, ensuring that educators and learners can rely on it during instruction.

Presentation and organization are essential for engaging and maintaining learners' interest. The high ratings in this category reflect the manipulative's ability to present information clearly and attractively, which is crucial for effective learning experiences (Velasco et al., 2023).

Finally, the up-to-datedness of information ensures that the material is relevant and reflective of the latest educational standards and practices. Li and Kaiser (2010) emphasize the importance of current information in maintaining the relevance and effectiveness of educational tools. The manipulative's high rating in this area indicates its alignment with current educational trends and practices.

Table 1 Experts' Evaluation of Integra Quest: A Numeracy Adventure

Category	SD	M	Description
Content	0.09	3.96	Highly Acceptable
Instructional Quality	0.18	3.72	Highly Acceptable
Technical Quality	0.30	3.52	Highly Acceptable
Presentation and Organization	0.30	3.28	Acceptable
Up-to-datedness of Information	0.47	3.62	Highly Acceptable
Note: 3.51-4.00 = Highly Acceptable, 2.51-3.50 = Acceptable, 1.51-2.50 = Moderately Acceptable, 1.00- 1.50 = Barely Acceptable			

Participants' Evaluation

After the posttest, learners also evaluated the manipulatives using a similar evaluation instrument that encompassed five key aspects: content, instructional quality, usability, presentation, and design. Out of the 39 learners who participated in the intervention, 33 who completed the pretest and posttest were involved in the evaluation process. Their feedback was gathered to assess the material's usability, engagement, and impact on their learning experience, ensuring a comprehensive review from both expert and learner perspectives.

Table 2 presents the learners' evaluation. This revealed that The Integra-Quest: A Numeracy Adventure is "acceptable" across all assessed categories. This indicates that learners rated the manipulative positively on all key aspects, including content (M = 3.46, SD = 0.33), instructional quality (M = 3.37, SD = 0.38), usability (M = 3.26, SD = 0.65), presentation (M = 3.49, SD = 0.44), and design (M = 3.37, SD = 0.46).

The acceptability ratings across all categories underscore the overall effectiveness and quality of The Integra-Quest: A Numeracy Adventure. Learners found the content to be relevant and well-aligned with educational objectives, suggesting that the manipulative provides substantial educational value. The instructional quality rating reflects the manipulative's ability to facilitate effective teaching and learning processes, making it a valuable tool for educators.

Usability, an essential factor for both teachers and learners, was also rated acceptable. This implies that the manipulative is user-friendly and practical, ensuring that it can be easily integrated into various instructional settings. The high rating in presentation indicates that the manipulative is visually appealing and well-organized, which can significantly enhance student engagement and comprehension.

Design, encompassing the overall look, feel, and functionality of the manipulative, was also highly rated. This suggests that the manipulative is not only effective in terms of content delivery but also aesthetically pleasing and functionally sound. According to Mazo (2020), the design and usability of educational tools are critical factors that contribute to their success and acceptance among users.

The positive feedback from both experts and learners highlights the comprehensive strengths of The Integra-Quest: A Numeracy Adventure and its potential to improve numeracy skills among learners. By continuously incorporating feedback and making necessary adjustments, the educational tool can remain effective and relevant in an ever-evolving educational landscape.

Table 2 Learners' Evaluation of Integra Quest: A Numeracy Adventure

Category	SD	M	Description
Content	0.33	3.46	Acceptable
Instructional Quality	0.38	3.37	Acceptable
Usability	0.65	3.26	Acceptable
Presentation	0.44	3.49	Acceptable
Design	0.46	3.37	Acceptable
Note: 3.51-4.00 = Highly Acceptable, 2.51-3.50 = Acceptable, 1.51-2.50 = Moderately Acceptable, 1.00- 1.50 = Barely Acceptable			

RECOMMENDATIONS

Future research should therefore replicate the study with larger and more diverse populations, including learners from urban and rural schools, private and public institutions, and varying socioeconomic backgrounds. Expanding the sample base would allow for more robust statistical analyses and provide stronger evidence of the tool's adaptability and effectiveness across contexts. Additionally, longitudinal studies could examine whether the positive impacts observed such as increased confidence and engagement in integer operations are sustained over time and transferable to other mathematical domains.

Experts' Evaluation of *Integra-Quest: A Numeracy Adventure*

The results of the expert evaluation provide a strong foundation for the continued refinement and enhancement of *Integra-Quest: A Numeracy Adventure*. In light of the findings, the following recommendations are advanced:

Sustaining Content Quality

Given the unanimous rating of "highly acceptable" in terms of content (M = 3.96, SD = 0.09), it is recommended that the developers maintain the current emphasis on conceptual clarity, alignment with mathematics standards, and integration of manipulatives. Periodic review of curricular trends and learner needs should be undertaken to ensure that the content remains both rigorous and relevant.

Strengthening Instructional Quality

The high rating for instructional quality (M = 3.72, SD = 0.38) suggests that the tool effectively supports learning processes. To further enhance this dimension, differentiated instructional strategies should be incorporated to address diverse learner profiles. Additionally, scaffolding techniques, formative assessments, and reflective prompts may be embedded to foster higher-order thinking skills and metacognitive awareness.

Refining Technical Quality

Although technical quality received a favorable rating (M = 3.52, SD = 0.65), further improvements are warranted to maximize usability and durability. Developers are encouraged to explore hybrid formats, including digital adaptations, to increase accessibility. Enhancements in interactivity and user-friendliness would further strengthen the tool's reliability and appeal in varied instructional contexts.

Improving Presentation and Organization

The relatively lower rating in presentation and organization (M = 3.28, SD = 0.44) indicates an area requiring deliberate refinement. Clearer layout structures, consistent visual cues, and modular organization should be prioritized to facilitate ease of navigation. The incorporation of learner-friendly graphics and concise instructional language is recommended to sustain engagement and optimize comprehension.

Ensuring Up-to-Datedness of Information

The favorable rating for up-to-datedness (M = 3.60, SD = 0.46) underscores the importance of maintaining alignment with evolving educational standards and practices. Regular revisions should be institutionalized to integrate contemporary pedagogical approaches, such as inquiry-based learning and digital literacy. Embedding real-world applications and culturally responsive examples will further enhance relevance and learner connection.

Institutionalizing Expert Feedback Cycles

Finally, it is recommended that systematic expert evaluations be institutionalized as part of the development cycle. Such feedback loops not only ensure quality assurance but also foster innovation and adaptability. Collaboration among instructional designers, educators, and researchers should be encouraged to sustain the tool's relevance and effectiveness in dynamic educational landscapes.

The expert evaluation affirms the comprehensive strengths of *Integra-Quest: A Numeracy Adventure*, particularly in content and instructional quality. Targeted refinements in presentation and organization, coupled with sustained expert feedback and periodic updates, will ensure that the tool continues to meet high standards of quality, usability, and pedagogical effectiveness.

Participants' Evaluation of *Integra-Quest: A Numeracy Adventure*

The evaluation conducted among participants provides valuable insights into the effectiveness, usability, and pedagogical relevance of *Integra-Quest: A Numeracy Adventure*. In light of the findings, the following recommendations are advanced:

Reinforce Learner-Centered Design

Participants' positive evaluation underscores the importance of maintaining a learner-centered approach. It is recommended that the tool continue to prioritize clarity, accessibility, and engagement, ensuring that learners of varying abilities can benefit from its features. Incorporating feedback from participants into iterative revisions will further enhance inclusivity and responsiveness to learner needs.

Enhance Engagement Strategies

While participants rated the tool highly in terms of instructional and technical quality, further emphasis should be placed on interactive and motivational elements. Gamified features, real-world problem contexts, and collaborative activities may be integrated to sustain learner interest and deepen mathematical understanding.

Strengthen Usability and Accessibility

Participants' evaluation highlights the importance of technical quality and ease of use. Developers should ensure that the manipulative remains durable, user-friendly, and adaptable to diverse learning environments. Exploring digital versions or hybrid formats may broaden accessibility, particularly for learners in resource-constrained settings.

Improve Presentation and Organization

Although participants found the tool acceptable in terms of presentation and organization, refinements are necessary to optimize clarity and navigation. Streamlined layouts, consistent visual cues, and learner-friendly graphics should be prioritized. Such improvements will enhance comprehension and reduce cognitive load, thereby supporting more effective learning experiences. It is essential to establish a stronger visual hierarchy to emphasize key concepts and guide learner attention effectively. The use of bold headers, strategic spacing, and color accents can highlight critical information and improve readability. Instructions should be concise and supported by relevant visuals to reinforce comprehension and reduce cognitive strain. In addition, embedding quick feedback prompts or reflection boxes at the end of each section is recommended to foster active

engagement and encourage self-assessment. These enhancements will improve clarity, accessibility, and pedagogical impact, ensuring that the manipulative provides a more engaging and effective learning environment.

Maintain Relevance and Currency

Participants emphasized the importance of up-to-datedness in educational materials. Regular revisions should be institutionalized to ensure alignment with current curricular standards and pedagogical innovations. Embedding culturally responsive examples and real-world applications will further strengthen the tool's relevance to learners' contexts (Li & Kaiser, 2010).

Institutionalize Continuous Feedback Mechanisms

Finally, participants' evaluation highlights the value of systematic feedback in sustaining quality. It is recommended that learner evaluations be integrated into the development cycle alongside expert reviews. This dual feedback mechanism will ensure that *Integra-Quest: A Numeracy Adventure* remains both pedagogically sound and learner-responsive, thereby maximizing its impact on numeracy development.

Participants' evaluation affirms the strengths of *Integra-Quest: A Numeracy Adventure* in terms of instructional quality, technical robustness, and relevance. Targeted refinements in presentation and organization, coupled with sustained learner feedback and periodic updates, will ensure that the tool continues to meet high standards of quality, usability, and pedagogical effectiveness.

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APPENDIX

The Integra-Quest: A Numeracy Adventure Game Board

$\not\equiv$ Not Identical to | δ Delta (Lowercase) | Γ Gamma (Uppercase) | $<$ Less Than | $\times$ Multiplication Sign or Times | $\forall$ For All Sign | $\neq$ Not equal to | γ Gamma (Lowercase) | $\cong$ Approximately equal to | $\geq$ Gretater Than or Equal To

∞ Infinity

GENERAL INSTRUCTION

The following are the materials needed:
Game board sheet, 2 Dice, Chips/Coin
Timer/Stop watch, Score sheet, and pencil
The game can be played by at most 4 players.

$+$ Plus Sign or Addition Sign

$\div$ Division Sign

Integra-Quest: A Numeracy Adventure

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$\mathbb{R}$ The Set of Real Numbers

$>$ Greater Than

A. HOW TO PLAY

1. Place the game board on a flat surface.
2. Choose a chip/token from a set of chips/tokens provided, and place on the starting point or square of choice.
3. Determine who plays first by rolling a die. The one with a highest number will be the first player.
4. Roll 2 dice. Determine the sum. (example; (3,1), 3+1 = 4, move 4 squares)
5. Move your chip/token n-square (based on the sum) around the board in a clockwise direction and determine the color of the square.
6. Follow the direction in the color scheme. This will be the basis of the set where the player's question will be taken.
7. To record the score, it can be done by players who's not in his/her turn if there is no arbiter available.

$\not<$ Not Less Than

B. COLOR SCHEME

To select a question, roll two dice in succession. If the outcome is (3,1), then answer question (3.1) from the subsequent set.

YELLOW	Earn 1 point if you answer the question correctly in 15 seconds in SET A
BLUE:	Earn 2 points if you answer the question correctly in 30 seconds in SET B
ORANGE	Earn 3 points if you answer the question correctly in 45 seconds in SET C
PURPLE	Earn 4 points if you answer the question correctly in 60 seconds in SET D
RED	You do not need to answer any question but roll a die again. If the result is 1, add 1 to your score. If the result is prime (2, 3 or 5), retain your score; otherwise (4 or 6) subtract 1.
GREEN	BONUS square: When you land on a green square: Roll a die. If the result is a prime (2, 3, 5), add the prime number to your score. If the result is even (4, 6), add 2 to your score. If the result is 1, add 1 to your score.

$\not\geq$ Neither Less Than nor Equal To

π Pi

σ Sigma (Lowercase)

Σ Sigma (Uppercase)

C. ADDITIONAL RULES:

1. Every player must correctly solve the problem in every turn.
2. If a player cannot provide the correct answer, their chip remains on the current square, and they must wait until their next turn to select another question and try again until they answer correctly.
3. The game can be structured to either have a predetermined number of rounds, or it can continue until one player attains 30 points.

Alternatively, it can also be played for a duration of 30 minutes, with the player having the highest score at the end declared the winner.

$\mathbb{N}$ The Set of Natural Numbers

$\leq$ Less Than or Equal To

$\propto$ Proportional To

$-$ Minus Sign or Subtraction

$\mp$ Mius Plus Sign

$\mathbb{Q}$ The Set of Rational

$\equiv$ Identical to / Equivalent | Δ Delta (Uppercase) | Ω Omega (Uppercase) | $\not\leq$ Neither Less Than nor Equal To | $\mathbb{Z}$ The Set of Integers | $\pm$ Plus Minus Sign | $=$ Equal To | Φ Phi | $\therefore$ Therefore | $\not>$ Not Greater Than