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A Board Game Design Study for Children's Online Consumption Safety Education

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Abstract

With the trend of younger children accessing the Internet and the widespread use of mobile payment, online consumption risks have become increasingly prominent. Existing online safety education for children is largely based on knowledge transmission, making it difficult to effectively improve children's risk identification and response abilities in real online consumption contexts. Taking children aged 7-12 as the research object, this paper integrates Piaget's theory of cognitive development, Bloom's taxonomy of educational objectives, situated cognition theory, and board game design theory. By adopting case analysis and educational objective transformation, this study extracts six core knowledge modules from cases of children's online consumption in mainland China: consumption identification, money mapping, account and payment boundaries, inducement recognition, consequence prediction and delayed decision-making, and help-seeking and remediation. These modules are further transformed into hierarchical educational objectives. On this basis, three high-frequency scenarios—game recharge, live-streaming tipping, and online shopping—are constructed, and a task mechanism of "event triggering-choice judgment-outcome feedback-review" is formed. A gamified board game design scheme for children's online consumption safety education is then proposed. The study argues that board games can reduce the difficulty of children's understanding of online

consumption risks through concretized, situated, and interactive approaches, and can promote risk identification, prudent judgment, and active help-seeking awareness in simulated decision-making, thereby providing an implementable design scheme for children's online consumption safety education.

Keywords: children's online consumption safety; gamified design; board game; educational objective transformation

1. Introduction

With the development of the Internet, mobile devices, and digital entertainment platforms, children are accessing the Internet at increasingly younger ages, and the scale of child Internet users has continued to rise. Relevant data indicate that the proportion of minors who accessed the Internet before the age of five has exceeded 10%, while the proportion of minors aged six to ten who have accessed the Internet has surpassed 60% (Editorial Department of This Journal, 2018). According to the 2024 Survey Report on Internet Use among Chinese Adolescents, the number of adolescent Internet users in China has reached approximately 185 million. Internet use among minors shows clear characteristics of younger access and growing popularity. The report indicates that more than one-third of the surveyed adolescents have engaged in paid activities on various online platforms, and nearly 15% spend more than 100 yuan per week on online consumption. For the 7-12 age group examined in this study, online game recharging, tipping on short-video and live-streaming platforms, and online shopping are currently the three core scenarios of online consumption. Overall, younger Internet access, continuous growth in the scale of Internet users, and increasing Internet use time have become increasingly evident. The Internet has been fully integrated into learning, entertainment, and social interaction, becoming an indispensable part of children's daily lives. While this trend broadens children's digital horizons and brings diverse development opportunities, it also produces multiple overlapping risks in emerging scenarios such as online consumption, creating an urgent need to improve children's risk identification ability and self-protection literacy.

In response to risks associated with minors' Internet use and online consumption, China has continuously strengthened institutional measures in recent years. The Notice on Preventing Minors from Becoming Addicted to Online Games issued in 2019 requires real-name registration for online games and imposes restrictions on minors' gaming time, duration, and

payments. The 2021 Notice on Further Strict Management to Effectively Prevent Minors from Becoming Addicted to Online Games further stipulates strict control over minors' participation in online games in terms of gaming permission, use time, and recharge behavior (Liu, 2024). The 2022 Opinions on Regulating Online Live-streaming Tipping and Strengthening the Protection of Minors explicitly prohibit minors from participating in live-streaming tipping, and online platforms are not allowed to develop mechanisms that induce minors to tip or participate in various forms of paid “gifts” (Sang, 2024). These policies reflect the national emphasis on the governance of minors' online activities.

However, the improvement of institutional rules does not mean that risks will disappear, nor does it mean that children already possess the ability to identify and respond to them. At the family level, some parents lack sufficient understanding of children's online consumption risks and platform-induced consumption mechanisms. They may not pay adequate attention to the risks brought by convenient payment methods such as password-free payment, fingerprint payment, and facial recognition payment, making it difficult to establish clear payment boundaries and guardianship rules in time. For example, in 2024, a case occurred in Tengchong City, Yunnan Province, in which an adolescent frequently used a parent's mobile phone for game recharges, accumulating more than 10,000 yuan in payments. With the assistance of local police, part of the recharge amount was eventually recovered (Sang, 2025). This case shows that adolescents may have weak legal awareness and may be easily influenced by platform inducement or guidance from strangers, leading to online consumption. At the school level, current online information identification education in primary and secondary schools is mainly carried out through class meetings, lectures, examinations, and classroom teaching (Liang, 2022). These approaches lack interactivity and interest, and therefore may not effectively attract children's attention. Educational content often focuses on general requirements such as personal privacy protection and online fraud prevention, while insufficiently addressing practical issues related to inappropriate online consumption behavior. As a result, children may not know how to respond correctly in real online scenarios. At the platform level, although online games and online platforms have set up anti-addiction systems and minor consumption mechanisms, interface designs such as virtual currency, gift tipping, rankings, and limited-time offers still increase children's tendency toward impulsive consumption to some extent. Relevant research points out that minors in online live-streaming and platform consumption scenarios are easily influenced by interactive inducement, emotional stimulation, and virtual consumption mechanisms, leading them to recharge or tip. Platforms still have room for improvement in

identity verification, payment restrictions, and risk reminders (Cheng & Fan, 2019). Against this background, online consumption safety education for children has become an urgent need.

Therefore, the issue of children's online consumption safety cannot be addressed only through institutional constraints and platform governance. Educational intervention is still needed to improve children's risk identification, judgment, and response abilities in specific online contexts. Compared with traditional knowledge transmission, gamified teaching emphasizes situated participation, task-driven learning, and behavioral feedback, which can compensate for the lack of interactivity and practical experience in children's online consumption safety education to a certain extent. Based on this, this paper draws on Piaget's theory of cognitive development, Bloom's taxonomy of educational objectives, situated cognition theory, and board game design theory. Focusing on typical risk scenarios such as game recharge, live-streaming tipping, and online shopping, it explores a gamified teaching design path for children's online consumption behavior safety and further proposes a board game design scheme, providing a reference for content innovation and methodological transformation in children's online safety education.

2. Literature Review

2.1 Research on Relevant Educational Theories

2.1.1 Piaget's Theory of Children's Cognitive Development

Piaget divided children's intellectual development into four stages. The concrete operational stage generally corresponds to children aged 7-12. At this stage, children have already developed a general logical structure and are able to conduct concrete operations, that is, logical operations in relation to concrete objects and situations (Sun, 2012). This indicates that children in this age group already possess the ability to understand rules, participate in decision-making, and bear consequences. However, their learning still needs to rely on concrete materials, visual cues, and operational experience.

Children's online consumption safety, as discussed in this study, involves the relationship between online consumption and real money, as well as judgments about whether consumption behavior is appropriate in Internet use. If such education is provided only through popular science explanations, children may lose interest or find it difficult to understand. By contrast,

gamified teaching better fits the cognitive characteristics of children in the concrete operational stage, who rely on concrete objects to conduct logical operations.

2.1.2 Bloom's Theory of Educational Objectives

Bloom and his colleagues classified educational objectives into three domains: cognitive, affective, and psychomotor domains (Xiao et al., 2014). The cognitive domain is divided into six levels, including knowledge, comprehension, application, analysis, synthesis, and evaluation. Except for the application level, the other five levels include their own subcategories. From a theoretical perspective, these six levels progress from shallow to deep and from concrete to abstract, reflecting the idea of a cumulative hierarchical structure (Wu et al., 2018). The significance of this theory is that it can transform abstract knowledge and broad educational intentions into specific learning objectives that are layered, operable, and observable.

In children's online consumption safety education, if the objective remains only at the level of "knowing not to spend money carelessly," it is still merely a form of basic knowledge input and cannot support children's judgment and action in real online contexts. Therefore, this study transforms online consumption safety education into a progressive process from identification and understanding to application, analysis, and evaluation, enabling children to recognize real consumption and make appropriate judgments in specific situations.

2.1.3 Situated Cognition Theory

Situated cognition theory originated in the late twentieth century. Its core argument emphasizes that knowledge acquisition and learning processes are essentially context-dependent, and that knowledge and behavior are interdependent and closely integrated. Knowledge cannot be discussed apart from context, because situatedness constitutes an essential attribute and component of knowledge and learning (Dai et al., 2022). Learners' genuine mastery of knowledge usually requires understanding, application, and reflection in real or simulated situations (Brown et al., 1989). In other words, decontextualized instruction may lead learners to "know what to say but not know what to do," making it difficult for them to respond in real situations.

When discussing children's online consumption safety, risks do not appear as isolated knowledge points. Instead, they are embedded in concrete consumption scenarios such as game recharge, live-streaming tipping, and online shopping. Strategies such as ranking incentives, limited-time offers, and low-price inducements influence whether children can identify "whether money is being spent," "whether they are being induced to consume," and "whether

consumption should be paused." The key lies in their cognitive judgment within specific situations. Therefore, situated cognition theory provides theoretical support for the gamified design of this study. Through situated simulation, operational tasks, and reflective task design of online consumption safety knowledge, children can construct more stable risk identification and response mechanisms through interaction and choice.

2.2 Board Game Mechanism Design

Board games differ from other types of games in that players usually gather face to face and use boards, pieces, figures, toys, or cards with rule-based functions derived from human productive and social practices to conduct interactive activities. Through interaction and communication, board games offer enjoyable challenges that can improve logical thinking, memory, and judgment (He, 2012). Board games use physical operation and verbal communication, allowing learning to occur naturally through hands-on action, observation, and discussion. Their designs are usually composed of rules, objectives, decision-making, and feedback mechanisms. Under limited rules, children consider how to weigh risks and make judgments, thereby promoting logical reasoning, strategic thinking, and problem-solving ability. From the perspective of children, the tangible presentation of board games reduces the difficulty of understanding. Abstract and dull knowledge about online consumption safety can be transformed into visualized game content. For example, tokens in board game design can help children intuitively feel expenditure, and the movement of objects can help them understand causal relationships and behavioral consequences. A game map can simulate decision-making environments, allowing players to engage in trial and error within situations and experience the structure generated by different choices.

In summary, children aged 7-12 have the ability to understand rules and make judgments, but they still need situated and visual materials to understand complex concepts. Bloom's taxonomy of educational objectives provides a transformation path from knowledge to attitude and then to skills. Situated cognition theory further shows that knowledge should be acquired in real or simulated situations. Board games can serve as carriers of rules, tasks, feedback, and reflection.

Therefore, this study first extracts children's online behavior safety knowledge modules from real cases in mainland China, then completes the transformation of educational objectives based on Bloom's taxonomy. It then embeds educational objectives into game situations and task mechanisms, and finally forms a board game prototype.

3. Gamified Design Framework for Children's Online Consumption Behavior Safety

3.1 Extraction of Online Behavior Safety Knowledge

Based on the research background and literature review above, children's online consumption safety in this paper does not refer to general norms of Internet use. Instead, it focuses on irrational consumption risks arising from insufficient identification ability, misjudgment, or inducement in current online consumption scenarios involving children. Accordingly, this paper uses real cases of children's online consumption in mainland China as the entry point to analyze core risks and extract knowledge points related to online behavior safety. This extraction path enables the knowledge content to respond directly to real scenarios.

Table 1. Extraction of Children's Online Behavior Safety Knowledge

Real Case	Core Risk Exposed	Extracted Online Behavior Safety Knowledge	Rule Transformed for Children	Corresponding Module
In April 2022, a fifth-grade girl used her father's Alipay account and paid 5,949.87 yuan to a game card shop in four transactions. The court held that the amount clearly exceeded what was appropriate for her age and intellectual capacity and ordered a refund.	She regarded "small recharges in several installments" as not serious; used a parent's payment account; and lacked awareness of accumulated amounts.	1. Game recharge is real consumption. 2. Multiple small payments can accumulate into a large amount. 3. A parent's account is not a resource that children can freely use.	Do not pay with an account that is not yours.	Consumption identification
In April 2024, a 12-year-old child used a website account linked to his grandfather's WeChat account without the grandfather's knowledge, recharging 25 times and spending a total of 977.60 yuan to purchase game currency.	Continuous small recharges were mistaken for "not spending much"; game currency obscured the real price; the child had difficulty mapping virtual currency to real money.	1. Game currency is not "fake money"; it corresponds to real expenditure. 2. Continuous small recharges also constitute consumption. 3. Recharging game currency before spending makes it easier to ignore expenditure.	Recharging game currency is also spending money; when seeing points, diamonds, or game coins, first convert them into real money.	Money mapping
In September 2023, an 11-year-old boy used his mother's WeChat account to recharge more than 20,000 yuan into a game account registered in his mother's name. The court eventually ordered the platform	The child used a parent's account and a game account registered in the parent's name; the child mistook "being able to log in/pay" as "being allowed to decide independently."	1. A parent's account and payment account do not mean that children can use them freely. 2. Being able to log in does not mean being allowed to consume. 3. The absence of guardianship boundaries expands losses.	An account that is not yours should not be used for payment; being able to enter a game does not mean you can spend money on your own.	Account and payment boundaries

to refund half of the amount.				
In April 2022, a 10-year-old boy used his mother's mobile phone during an online class and was guided by an advertisement to download an online game live-streaming app, after which he engaged in tipping.	Advertisement diversion; a shift from "watching live streams" to "tipping"; direct payment using a parent's mobile phone.	1. Advertising links may turn entertainment into consumption. 2. Live-streaming gifts and tipping are real consumption. 3. Using a parent's phone does not mean using the parent's money is allowed.	When entering a live stream, first check whether there are gift or recharge buttons.	Inducement recognition
From September 2023 to March 2024, an 11-year-old boy used his mother's WeChat account to recharge more than 20,000 yuan into a game account registered in his mother's name. The court ordered the platform to refund half of the amount, but also held that the mother had failed to fulfill her guardianship responsibilities.	Parent's account, parent's real-name game account, and payment account were bound together; the child continuously used convenient payment; prior guardianship was absent.	1. Real-name accounts, payment binding, and device management jointly constitute consumption boundaries. 2. Being able to recharge does not mean it is reasonable. 3. Family guardianship is part of children's online consumption safety.	One's own decision should not go beyond family rules; confirm whether guardian consent has been obtained first.	Consequence prediction and delayed decision-making
In July 2023, a 12-year-old child used a WeChat account linked to the mother's mobile phone to recharge more than 20,000 yuan into a game without the parents' knowledge. The parents only discovered the abnormality when paying hospital fees. After failed negotiations with the platform, they sued, and mediation resulted in a refund of more than 18,000 yuan.	The abnormal consumption was not discovered immediately; parents paid insufficient attention to payment records; if evidence is not preserved in time, subsequent refunds and rights protection become more difficult.	1. After an accidental payment, children should inform parents promptly. 2. Transaction records, bank statements, and chat records are important evidence for remediation. 3. Post-event remediation is important but cannot replace prior judgment and payment boundary management.	After an accidental payment, immediately inform an adult, take screenshots, and keep records.	Help-seeking and remediation

Source: Compiled by the author.

Based on the above cases, this study extracts six core modules of children's online consumption safety knowledge: (1) consumption identification, (2) money mapping, (3) account and payment boundaries, (4) inducement recognition, (5) consequence prediction and delayed decision-making, and (6) help-seeking and remediation.

3.2 Transformation of Educational Objectives

Combined with the six knowledge modules proposed above, Table 2 shows that this study transforms children's online consumption safety education objectives into a progressive process

from “identification” to “judgment.” At the knowledge level, children need to identify that recharging, tipping, shopping, and purchasing virtual items are all forms of real consumption. At the comprehension level, children need to understand the relationship between virtual currency and real money, as well as the boundaries among parents' accounts and payment tools. At the application level, children should apply learned rules in situations, such as pausing before a payment page to consider whether the price is beyond an acceptable range, whether they need to ask a parent, or whether they should exit the page. At the analysis level, children need to identify platform inducement methods such as interface prompts or advertising diversion, and analyze their influence on consumption. At the synthesis level, children should be able to combine real consumption scenarios to form a complete response approach. At the evaluation level, they should judge the reasonableness, safety, and necessity of a particular consumption behavior.

Table 2. Transformation of Educational Objectives for Children's Online Consumption Safety

Knowledge Level	Corresponding Knowledge Module	Learning Focus	Observable Performance
Knowledge	Consumption identification; money mapping	Recognize that recharge, tipping, and shopping are real consumption	Understand that “this is spending money”
Comprehension	Money mapping; account and payment boundaries	Understand the boundaries between virtual currency and real money, and between parents' accounts and payment tools	Know whether one should “ask a parent before paying”
Application	Consequence prediction and delayed decision-making; help-seeking and remediation	Use strategies such as pausing, asking, and exiting in specific situations	Think before paying
Analysis	Inducement recognition; account and payment boundaries	Analyze stimulation methods such as online interface language and prompts	Recognize that “this is inducing me to consume”
Synthesis	All six modules	Combine real consumption scenarios to form a complete response approach	Propose a safer course of action
Evaluation	Consequence prediction and delayed decision-making	Analyze stimulation methods such as first-recharge offers, rankings, flash sales, and persuasive language	Judge “whether I should pay now”

Source: Compiled by the author.

3.3 Game Scenarios and Task Mechanism Design

Based on the real-case analysis above, children's online consumption scenarios mainly occur in game recharge, live-streaming tipping, and online shopping. Therefore, the game scenarios are set around these three contexts. The game recharge scenario corresponds to consumption identification, money mapping, and consequence prediction. The live-streaming tipping

scenario corresponds to inducement recognition and payment boundaries. The online shopping scenario corresponds to delayed decision-making and help-seeking remediation.

In terms of task mechanism, the process of "event triggering-choice judgment-outcome feedback-review" is adopted. Players draw event cards on the game map and enter specific situations. They then consider whether they should "consume immediately" or "ask a parent." Different judgments lead to different feedback. For example, correct judgments may increase tokens, wrong judgments may reduce tokens, and uncertain players may use consultation cards to ask a teacher or parent. Through such differences in feedback, children can intuitively understand the distinction between impulsive consumption and prudent judgment.

3.4 Board Game Design Scheme

Based on the previous extraction of knowledge, transformation of educational objectives, and design of scenarios and task mechanisms, this study designs an educational board game for children aged 7-12. The game adopts the basic principles of path progression, turn-based action, event triggering, and resource increase or decrease. It integrates three high-frequency risk scenarios—game recharge, live-streaming tipping, and online shopping—into one game map. Players move sequentially across different nodes, draw event cards, and make decisions such as "whether payment is needed" or "whether a parent should be consulted" according to the situation. Different choices affect game resources, leading to differentiated changes in tokens.

As shown in Table 3, the board game mainly includes a map, player pieces, event cards, tokens, consultation cards, and safety badges. The map presents the three types of online consumption scenarios. Event cards trigger specific problem situations. Tokens simulate disposable resources. Consultation cards provide players who cannot judge a situation with the opportunity to ask teachers or parents for help. Safety badges are used as rewards for children who make prudent judgments at the end of the game. At the end of the game, players are evaluated by combining their remaining tokens with the core outcome indicators of "being able to judge, reducing impulsiveness, and knowing how to seek help," rather than simply pursuing resource accumulation. After the game, a brief review is arranged. Parents or teachers guide children to explain the reasons for their choices and summarize their playing experience, so that game experience can be transformed into behavioral decisions for online consumption scenarios in daily Internet use.

Table 3. Components of the Board Game Prototype

Component	Function
Map	Presents three major online consumption scenarios
Player piece	Represents the player's position and action progress on the game map
Event card	Triggers specific consumption situations
Token	Simulates disposable resources
Consultation card	Provides opportunities for help-seeking
Safety badge	Rewards children at the end of the game

Source: Compiled by the author.

4. Conclusion

This study focuses on children's online consumption safety. It extracts six knowledge modules from real cases: consumption identification, money mapping, account and payment boundaries, inducement recognition, consequence prediction and delayed decision-making, and help-seeking and remediation. Based on Bloom's taxonomy of educational objectives, these modules are transformed into educational objectives. On this basis, three core scenarios—game recharge, live-streaming tipping, and online shopping—are constructed, and a task mechanism of "event triggering-choice judgment-outcome feedback-review" is formed. An educational board game design prototype is then proposed.

This study indicates that board games can transform online consumption risk knowledge, which often lacks interest and interactivity, into learning approaches that children can understand, participate in, and reflect upon. Compared with traditional teaching methods, this design places greater emphasis on children's choice judgment, consequence perception, and help-seeking awareness in simulated situations, providing a feasible design path for online consumption safety education for children aged 7-12.

Due to limitations in research materials and verification conditions, this study mainly relies on real cases for analysis and has not yet examined children's actual learning situations. The board game remains at the scheme design stage, and its educational effects, game rhythm, and task difficulty require further verification. Future studies may carry out trials in school or family education settings and evaluate the influence of the design on children's risk identification, delayed decision-making, and active help-seeking abilities through observation and interviews. The game content and application methods can then be continuously optimized based on feedback.

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