

RE-Opardy: An Exploratory Study of a Jeopardy-Inspired Activity for Formative Assessment in REE*

Anthea Moravánszky

University of Szeged, Doctoral School of Education, Hungary & University of Applied Sciences of the Grisons, Pulvermühlestrasse 57, 7000 Chur, Switzerland

Abstract

Gamification has gained increasing attention in Requirements Engineering Education (REE) as a means to strengthen engagement and support experiential learning. While current REE research mainly focuses on digital serious games and simulation-based environments for training specific RE skills, less attention has been given to gamified activities as formative assessment tools embedded in regular classroom teaching.

This paper reports on an exploratory case study investigating a Jeopardy-inspired classroom activity, RE-Opardy, designed to support reflection, conceptual understanding, and formative feedback in an undergraduate RE course. In contrast to time-pressured multiple-choice quizzes, the activity required students to actively retrieve and articulate concepts based on answer prompts derived from existing quiz materials. The format was implemented across several instructional contexts, including preparatory checks, end-of-unit reflection, and a team-based end-of-semester review. Data were collected through a post-course questionnaire and complemented by instructor observations.

Results indicate that students experienced the activity as promoting reflective thinking, reducing time pressure, and supporting conceptual consolidation. Instructor observations suggest that the format made differences in student preparation and conceptual certainty more visible while providing opportunities for immediate formative feedback and clarification. At the same time, oral participation requirements and increased time demands introduced design challenges related to inclusiveness and classroom integration.

The findings position Jeopardy-style gamified activities as a promising low-threshold formative assessment approach in REE. The study supplies design-oriented insights on question transformation, participation structure, and instructional integration to guide future implementations and evaluation.

Keywords

Requirements Engineering Education (REE), Gamification, Formative Assessment, Higher Education

1. Introduction

1.1. Gamification in Requirements Engineering Education

Gamification and serious games have attracted increasing interest in Requirements Engineering Education (REE) as strategies to enhance student engagement and address the abstract, practice-oriented nature of RE concepts. Prior studies have investigated a range of game-based approaches, including digital serious games, simulations, role-playing activities, and scenario-based learning environments [1, 2]. These approaches are typically intended to replicate authentic stakeholder interactions, requirements elicitation processes, or modelling tasks, thereby facilitating experiential learning and skill development.

Existing research has primarily concentrated on the design and evaluation of custom-built educational games. Notable examples include state-based serious games for requirements elicitation [3], story-driven environments for teaching user stories [4], and interactive platforms for learning requirements specification and analysis [5, 1].

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✉ anthea.moravanszky@fhgr.ch (A. Moravánszky)

ORCID 0009-0001-3055-6689 (A. Moravánszky)



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In a broader context, REE has shifted from rote memorisation toward learner-centred approaches that prioritise active engagement, reflection, and formative learning processes [6]. Despite these advancements, limited attention has been given to the integration of formative assessment instruments within comprehensive instructional designs. Formative assessment is defined as all activities undertaken by teachers and/or students that provide information used to provide feedback to modify teaching and learning activities [7]. In particular, the use of gamified activities to promote reflection, retrieval practice, and diagnostic feedback during or after instruction remains underexplored [1, 2]. This gap underscores the need for gamification approaches that are accessible, adaptable, and consistent with formative assessment principles.

In previous course iterations that utilised time-based quiz platforms, correct answers did not always reflect secure conceptual understanding, as students could depend on recognition cues or guessing among predefined options. Consequently, these formats offered limited insight into students' actual understanding, despite maintaining high engagement. To address this issue, a Jeopardy-inspired format was introduced as a low-stakes formative assessment activity within the same course. Unlike conventional multiple-choice quizzes, this approach requires learners to actively retrieve and articulate concepts without answer cues, thereby making differences in conceptual certainty more apparent while maintaining the motivational benefits of a game-based environment. This paper presents the design and classroom implementation of this activity and offers initial insights into its potential to support formative assessment in REE at the higher education level.

1.2. Jeopardy and Kahoot as Distinct Gamification Formats

Game-based learning platforms such as Kahoot are widely adopted in higher education and are frequently implemented to enhance student engagement, attention, and motivation [8, 9]. Kahoot utilises time-based multiple-choice questions, individual devices, and competitive ranking mechanisms. These features promote broad participation, rapid activation of prior knowledge, and immediate feedback within an engaging learning environment.

Jeopardy-style formats utilise a distinct instructional approach. Instead of presenting questions with predefined response options, this format offers a description and requires learners to identify and formulate the corresponding concept. Unlike multiple-choice formats, which facilitate recognition through elimination of incorrect options, Jeopardy prompts require learners to retrieve and articulate concepts without answer cues. This method highlights differences in conceptual certainty and provides richer opportunities for formative feedback and clarification. The inversion shifts the cognitive task from answer recognition to retrieval, interpretation, and precise conceptual identification. Additionally, interaction in Jeopardy-style formats occurs at a shared pace and frequently involves oral explanation and collective reasoning. This structure reduces reliance on recognition cues and guessing strategies, thereby making differences in conceptual certainty more apparent and supporting elaborative retrieval, clarification, and discussion [10].

Comparative studies indicate that while time-pressured quiz systems such as Kahoot are effective for promoting engagement and rapid recall, Jeopardy-style formats foster deeper cognitive processing [11]. From a formative assessment perspective, Jeopardy is particularly suitable for diagnosing misconceptions, observing reasoning processes, and supporting conceptual understanding beyond simple answer correctness. This instructional design deliberately shifts the focus from rapid answer selection to active retrieval, explanation, and shared reasoning, which is especially relevant for conceptual subjects such as Requirements Engineering.

2. Design of RE-Opardy

2.1. Transformation of Quiz Questions into Jeopardy-Style Prompts

The study was conducted in an undergraduate Bachelor programme in Business Informatics. The course was a core Requirements Engineering module offered in the third semester, worth 4 ECTS credits. The course followed a flipped classroom format over ten sessions, with four teaching units per session.

A central design challenge involved transforming conventional quiz questions into Jeopardy-style answer prompts. Rather than presenting a question with predefined response options, this format provides a description and requires learners to identify and formulate the corresponding concept. This inversion shifts the cognitive task from answer recognition to retrieval, interpretation, and precise conceptual identification.

The existing quiz pool consisted of single- and multiple-choice items, as well as true/false statement sets, all of which provided answer cues via predefined options. These questions were previously used in Kahoot quizzes, quizzes within the learning management system Moodle during course units, and the final examination. Many items were based on preparation materials for the IREB CPRE Foundation Level certification. Transforming these questions into Jeopardy-style prompts requires reformulating them into concise answer statements that define, explain, or illustrate concepts, relationships, or scenarios. For instance, a conventional question such as “What is traceability?” was reformulated as the answer prompt “The ability to link requirements to their origin and implementation.” This reformulation shifts the task from recognising the correct answer to actively retrieving and articulating concepts.

The selected categories corresponded to the topics of the current teaching block and were intended to support reflection and consolidation of recently introduced concepts. Point levels served not only as a scoring mechanism but also as indicators of increasing specificity and required detail. Lower-value prompts (100–200 points) targeted well-known concepts and were designed to be more obvious. In contrast, higher-value prompts (400–500 points) required more detailed knowledge, such as concepts dependent on precise wording, finer distinctions between related terms, or details recognisable only to students who had thoroughly completed the preparation tasks and engaged with the nuanced aspects of in-class explanations. This structure facilitated formative assessment by making differences in conceptual certainty visible and by providing opportunities to clarify misunderstandings through discussion.

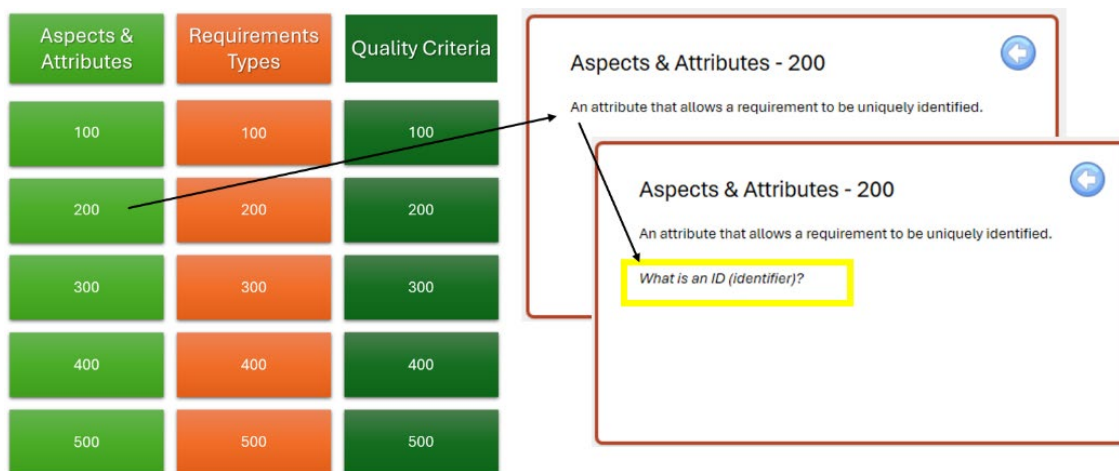


Figure 1: PowerPoint-based implementation of RE-Opardy showing the front page and an example of question navigation and answer reveal.

2.2. Deployment Scenarios Across the Semester

The RE-Opardy activity was incorporated into nine sessions throughout the semester, spanning various instructional contexts to achieve formative assessment objectives. In those sessions, a PowerPoint-based format was utilised (Figure 1), with each session featuring two or three topical categories aligned with the lesson content. Each category included five prompts with ascending point values (100–500), reflecting increasing specificity and required detail. In the first four sessions, the activity was implemented at the conclusion of teaching units to encourage reflection and consolidation. In the subsequent five sessions, it was introduced at the beginning to review preparatory self-study material.

Participation in the activity was voluntary, with students selecting categories and attempting to answer prompts. Rather than contributing to formal assessment, participation was incentivised through small tangible rewards. Correct answers were rewarded with sweets sorted by difficulty level (100–500), and students could select the next category. If an answer was incorrect, other students were invited to respond and assume the turn. Throughout the activity, the lecturer provided explanations, clarifications, and occasional hints, utilising both correct and incorrect responses to address misconceptions and reinforce conceptual understanding. This structure maintained the low-stakes, playful nature of the activity while preserving its formative assessment function.

In the final course session, an extended version of RE-Opardy was implemented using an online Jeopardy-style platform with a grid-based interface (Figure 2). This version included ten categories covering the entire course content and was structured as a team-based recap activity. The online format enabled efficient navigation, structured scorekeeping, and broader content coverage. The primary objectives were to facilitate integrative review, summarise course content, and provide students with an opportunity for self-assessment of exam preparedness.

Basics of RE	Fundamental Principles of RE	Systems Thinking	Types & Attributes	Quality Criteria	Elicitation	Boilerplates	U r a TOP MODEL!	Conflicted Views on Priorization	Requirements Management	
100	100	100	100	100	100	100	100	100	100	
200	200	200	200	200	200	200	200	200	200	
300	300	300	300	300	300	300	300	300	300	
400	400	400	400	400	400	400	400	400	400	
500	500	500	500	500	500	500	500	500	500	
				Team 1	Team 2	Team 3	Team 4			
				0	0	0	0			
				+	+	+	+			
				-	-	-	-			

Figure 2: Overview of the RE-Opardy end-of-semester version with ten categories covering the full course content (category headers translated from German to English for this paper).

At the end of the semester, an anonymous online survey was distributed, consisting of 11 Likert-scale items and two open-ended qualitative questions. The questionnaire items were grouped into four conceptual dimensions:

- (1) perceived usefulness for formative assessment (4 items),
- (2) cognitive processing and depth of thinking (4 items),
- (3) perceived cognitive challenge (2 items), and
- (4) motivational aspects of the gamified design (1 item).

3. Results

3.1. Student Survey Results

The course enrolled 21 students, with average attendance of approximately 12 per session. Six students completed the voluntary questionnaire. Although the small sample limits generalisation, the responses provide initial insights into student perceptions and support exploratory evaluation of the format under real classroom conditions.

Students generally perceived RE-Opardy as useful for monitoring their learning progress. Items related to checking preparatory self-study, assessing knowledge at the end of a course unit, and reviewing content at the end of the semester all received high mean ratings ($M = 4.00$ – 4.33 on a 5-point scale).

Items related to cognitive processing and reflection received particularly high ratings. Participants reported having more time to think compared to time-based quiz formats ($M = 4.83$) and perceived reduced time pressure as supporting more careful thinking ($M = 4.17$). Students also agreed that understanding was prioritised over speed ($M = 4.50$).

Students indicated that they engaged more in thinking about the content rather than guessing quickly ($M = 4.17$), suggesting that the activity supported elaborative retrieval and reflective reasoning rather than surface-level recall.

The perceived difficulty of the questions was rated as moderately high compared to traditional multiple-choice formats ($M = 4.00$), and the increasing difficulty levels (100–500 points) were considered meaningful ($M = 4.33$). This suggests that the graded structure of the questions was perceived as cognitively engaging without being overwhelming.

In contrast, the playful design elements, including rewards, received a lower mean rating ($M = 3.50$), indicating that motivational aspects were less central to students' perceived learning benefit than cognitive and reflective features of the activity.

3.2. Instructor Observations and Reflections

The RE-Opardy format highlighted disparities in student preparation and conceptual certainty more effectively than conventional quiz formats. This approach clearly distinguished students who had completed preparatory tasks, engaged with instructional explanations, and developed a robust understanding of the concepts from those who might have relied on guessing in multiple-choice assessments.

Simultaneously, the format created opportunities to support learning throughout the activity. When students could not answer prompts fully or accurately, the lecturer provided explanations and hints, often followed by a collective discussion to clarify misunderstandings. This approach clarified misconceptions in context and enabled students to refine their understanding progressively during the session.

However, the requirement to formulate answers verbally raised the participation threshold for certain students. In contrast to selecting predefined answer options, articulating concepts without cues demanded greater confidence and conceptual certainty. This finding is consistent with qualitative survey feedback, which indicated that oral participation formats made engagement more challenging for some learners.

Many students initially struggled with the lack of answer options. The format required active retrieval instead of recognition, which was unfamiliar to those only accustomed to conventional quiz formats. Some students expressed frustration with the increased challenge, while others responded positively and requested additional RE-Opardy sessions.

From an instructional perspective, the activity presented practical challenges. In comparison to time-based quiz platforms such as Kahoot, RE-Opardy required considerably more classroom time due to extended discussion, explanation, and learner-controlled pacing. This necessitated careful planning to allocate sufficient time without diminishing coverage of new course content. However,

the additional time investment facilitated deeper clarification of concepts and provided more comprehensive formative feedback.

4. Discussion

The findings indicate that the primary educational value of RE-Opardly lies in its support for formative assessment processes, rather than its competitive or playful elements. In contrast to time-based quiz formats, the Jeopardy-inspired structure requires learners to retrieve and articulate concepts without predefined answer options. This method highlights differences in preparation and conceptual certainty, enabling lecturers to diagnose misunderstandings more effectively during the activity.

Survey responses and classroom observations indicate that the format encouraged reflection, explanation, and shared reasoning. The activity created opportunities for immediate clarification, hints, and explanations when knowledge gaps became evident. This approach aligns with formative assessment principles, which emphasise using assessment to support and guide learning rather than solely to measure performance.

However, the format introduced consequential design trade-offs. Compared to time-based quiz platforms such as Kahoot, RE-Opardly required substantially more classroom time due to the need for verbal responses, discussion, and clarification. Additionally, the timing of the activity proved crucial. One participant noted that conducting the activity at the end of a session could be problematic, stating, “*at the end of the lecture, energy was low or there was too little time.*”

Participation dynamics emerged as a key issue. One student observed that “*introverted people like me tend not to participate as much in this game,*” while others expressed a desire for broader participation. These comments suggest that purely oral participation formats may disadvantage certain learner profiles and that additional participation structures, such as small group discussion before answering, may be necessary to ensure inclusive engagement.

Taken together, these observations suggest that Jeopardy-style gamified activities can function as effective formative assessment tools by supporting retrieval, articulation, and instructional feedback. However, their effectiveness depends strongly on careful question design, sufficient time allocation, and participation structures that support inclusive engagement.

5. Future Work

The design considerations identified in this exploratory study will inform future implementations. Specifically, the activity necessitates adequate classroom time, precise development of Jeopardy-style prompts, and participation structures that balance cognitive challenge with inclusive engagement. Structured formats, including brief pair or group discussions before answering, may reduce participation barriers while maintaining the benefits of retrieval-based learning.

Given the exploratory nature of the study and the limited sample size, the findings should be regarded as design-oriented insights rather than definitive evidence of measurable learning outcomes. Subsequent research will expand the evaluation to multiple course cohorts and instructional contexts to assess the robustness and scalability of the approach.

Planned improvements involve refining the conversion of conventional quiz questions into effective Jeopardy-style prompts and systematically evaluating their clarity, difficulty, and pedagogical suitability. Furthermore, the question set will be reviewed and evaluated. This process will help identify whether challenges stem from question formulation or from gaps in student understanding, and will facilitate the development of validated question collections for wider instructional application.

The approach will also be implemented and studied in hybrid teaching environments to further investigate how participation structures and facilitation strategies influence engagement, inclusiveness, and the effectiveness of formative assessment across distributed learning settings.

Declaration on Generative AI

During the preparation of this work, the author used Grammarly and OpenAI's ChatGPT in order to perform grammar and spelling checks and to improve clarity, phrasing, and coherence of selected text passages. After using these tools/services, the author reviewed and edited the content as needed and takes full responsibility for the publication's content.

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