International Journal of Business and Applied Social Science

E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3

https://creativecommons.org/licenses/by/4.0/

Check for Updates

CPER

Original Article | Open Access | Peer Reviewed

StockBingo: A Student-Curated Retrieval Practice Exercise for Management Information Systems Education

Michael J. Douglas, Ph.D.
Associate Professor of Management
Department of Management, Marketing and Information Technology
Lombardo College of Business
Millersville University of Pennsylvania
Email: michael.douglas@millersville.edu
ORCID iD: https://orcid.org/0009-0003-7119-8595
USA

ABSTRACT

Management Information Systems (MIS) courses introduce students to numerous companies, technologies, strategies, and organizational applications. Students may understand individual examples when presented with them yet struggle to retrieve and integrate them at the end of a semester. This article presents StockBingo, a culminating experiential exercise in which students receive individually randomized bingo sheets containing stock tickers for companies studied during the course and identify firms from instructor- and student-authored clues. Students may collaborate, but each remains accountable for a unique sheet. QR codes enable rapid verification of winning patterns. Students also use expertise developed through a company term paper to propose improved clues for future classes. StockBingo combines retrieval practice, structured gamification, collaboration, individual accountability, and student-generated content in a reusable learning activity.

KEYWORDS: retrieval practice; gamification; Management Information Systems; student-generated content; collaborative learning; educational technology

I. INTRODUCTION

Management Information Systems (MIS) courses frequently use company examples to illustrate information technologies, digital strategies, organizational processes, and competitive positioning. Over the course of a semester, however, students encounter dozens of organizations, products, technologies, and business concepts. Although students may understand individual examples when they are introduced, recalling and integrating that knowledge near the end of the course can be challenging. Conventional review sessions revisit content but often leave students in a largely passive role.

StockBingo was developed as a culminating review activity for an undergraduate MIS course organized around publicly traded companies. Students identify companies from clues and locate the corresponding stock tickers on individually randomized bingo sheets. The activity combines retrieval practice, collaboration, individual accountability, QR-code validation, and a faculty-curated repository of student-generated clues. While originally developed for MIS, the structure can be adapted to any course organized around a substantial body of named organizations, concepts, cases, people, or events.

II. THEORETICAL FOUNDATIONS

StockBingo is grounded primarily in retrieval-practice theory, which emphasizes active recall as a means of strengthening long-term retention [3]. Practice testing and active retrieval have been identified as effective learning techniques because learners must reconstruct information from memory rather than merely recognize it during review [1].

The activity also incorporates principles commonly associated with gamification. Students work toward recognizable goals through multiple winning patterns, randomized bingo sheets, controlled pacing, and immediate verification. Research suggests that such game elements can support engagement when they reinforce rather than replace learning objectives [2], [6]. In StockBingo, advancement depends on successful retrieval of course knowledge rather than chance alone.

Finally, StockBingo extends learning through student-generated content. Students use expertise developed through semester-long company research to critique existing clues and propose improved alternatives. Student-generated questioning and related activities can deepen understanding while revealing what learners consider meaningful, memorable, or difficult [4], [5]. Together, these elements position StockBingo as both a cumulative review exercise and a mechanism for continuous renewal of instructional materials.

III. LEARNING OBJECTIVES

After completing the exercise, students should be able to:

- Identify companies from clues concerning products, technologies, strategies, histories, or market events.
- Connect stock ticker symbols with corresponding companies.
- Retrieve and integrate company knowledge accumulated throughout the semester.
- Evaluate the effectiveness of instructional clues.
- Create concise company clues based on research and course knowledge.
- Collaborate with peers while maintaining responsibility for an individual response artifact.

IV. THE EXERCISE

A. Course Context

StockBingo is used during the final class meeting before the course examination. Throughout the semester, students study publicly traded companies and complete a comprehensive company term paper. The paper provides each student with specialized knowledge about one organization and serves as the foundation for later clue-development activities.

International Journal of Business and Applied Social Science

E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3

https://creativecommons.org/licenses/by/4.0/

Check for Updates

CPER

Original Article | Open Access | Peer Reviewed

Although designed for MIS, the exercise can be adapted to other disciplines. Courses organized around historical figures, legal cases, literary works, diseases, countries, scientific concepts, or other identifiable entities could substitute those items for stock tickers and companies while retaining the same instructional structure. Figure 1 shows how the activity fits in the semester.

Figure 1: Semester Ending Activity

B. Required Materials

The activity requires a pool of course companies, at least one clue for each company, randomized bingo sheets, a pacing mechanism, and a method for validating winning claims.

The original implementation uses a native macOS application written in Swift. The software generates unique bingo sheets, assigns QR codes, manages clue delivery, and validates winning patterns. Instructors without custom software could recreate the instructional design using commercially available bingo generators and alternative record-keeping systems.

C. Implementation Procedure

I) Distribute Bingo Sheets

Each student receives a unique bingo sheet containing stock tickers associated with companies studied during the semester. Because every sheet is different, students cannot simply follow another student's markings.

II) Provide a Preparation Period

Students receive approximately five minutes to review their sheets and identify unfamiliar ticker symbols or companies. During this period, they may consult class materials, personal notes, or other resources.

III) Explain Rules and Accountability

Students are encouraged to collaborate throughout the activity. They may discuss clues, compare interpretations, and help classmates identify companies. However, each student remains responsible for monitoring an individual bingo sheet and claiming a win independently.

IV) Explain Winning Categories

The first verified M-pattern, I-pattern, S-pattern, and blackout each produce one winner. Multiple winning categories help maintain participation after an initial winner has been identified.

V) Present Clues

The instructor presents clues at a controlled pace of approximately one clue every 20 seconds. After every 20 clues, gameplay pauses briefly so students can review their sheets, discuss uncertain answers, and recover from missed clues. Clues can address products, technologies, strategies, corporate history, branding, executives, locations, or recent business events. Their variety requires students to retrieve knowledge through multiple pathways rather than rely on a single memorized association.

VI) Verify Winning Claims

When a student claims a winning pattern, the instructor scans the sheet's QR code. The software reconstructs the sheet and verifies that clues for the appropriate companies have already been presented. QR verification provides a rapid and transparent process for confirming winners.

VII) Invite Repository Contributions

Following gameplay, students are invited to submit new or revised clues. In the original implementation, accepted clues earn a small amount of course credit and become part of the repository used in future course offerings.

D. Incentives

In the original implementation, each winner receives one final letter-grade increment, such as B+ to A- or A- to A. The incentive can be modified or omitted according to institutional policy, course structure, and instructor preference. Regardless of the reward chosen, instructors should ensure that grading practices remain consistent with institutional expectations.

V. STUDENT-GENERATED CLUES

The clue repository is a distinguishing feature of StockBingo. Students use expertise developed through semester-long company research projects to evaluate existing clues and propose new ones. Faculty review is required before any clue enters the repository, making the process student-generated but instructor-curated.

Creating an effective clue requires balancing accuracy, distinctiveness, accessibility, and memorability. Students who have spent an entire semester researching one company often propose clues based on specialized knowledge that classmates are unlikely to

International Journal of Business and Applied Social Science

E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3
https://creativecommons.org/licenses/by/4.0/

Check for Updates
CPER

Original Article | Open Access | Peer Reviewed

possess. References to obscure products, minor corporate events, or little-known historical details may be meaningful to the student author but ineffective for the broader class.

Faculty review addresses this challenge by evaluating whether a clue is likely to support retrieval rather than reward niche knowledge. Clues should allow classmates to infer the intended company using information reasonably connected to course learning.

Student collaboration frequently continues during clue development. Students often test clues with peers, revise wording, and discuss what makes a clue memorable or confusing. This process extends learning beyond gameplay by encouraging students to think about information from an instructional-design perspective rather than merely as content to be remembered.

Because technologies, products, corporate strategies, and popular culture change over time, clues can become dated. Student contributions therefore do more than expand the repository; they help keep the activity relevant for future cohorts.

Suggested acceptance criteria include whether a clue:

- Identifies only one intended company
- Is factually accurate and current
- Avoids reliance on obscure trivia
- Is concise enough for timed delivery
- Connects meaningfully with course content
- Differs from existing clues
- Does not reveal the company name or ticker
- Provides a memorable retrieval cue

VI. DEBRIEFING

A brief debriefing shifts attention from winning to learning. Students discuss which clues were easiest to recognize, which created confusion, and what characteristics made certain clues memorable. The conversation also encourages students to differentiate clues that rely on broad course knowledge from those requiring specialized cultural or organizational references.

Additional discussion can explore connections among technology, branding, products, strategy, and corporate identity. Because students have encountered the same companies repeatedly throughout the semester, the debrief often reveals how different forms of knowledge serve as retrieval pathways to the same organization.

VII. DISCUSSION

StockBingo extends traditional review activities by integrating retrieval practice, gamification, individual accountability, collaboration, and student-generated content within a reusable instructional system. The activity requires students to retrieve knowledge repeatedly while keeping participation active and visible.

Several design features address practical challenges associated with classroom review. Individual bingo sheets reduce direct copying, multiple winning categories support continued engagement, scheduled pauses prevent students from becoming overwhelmed, and QR verification provides an efficient method for confirming winners. These elements focus attention on retrieval while minimizing administrative friction.

The activity also creates a cycle that extends beyond gameplay. Students develop expertise through company research, apply that knowledge during retrieval practice, evaluate the effectiveness of clues, and contribute revised clues for future classes. The repository therefore functions not merely as a game resource but as a continuously renewed instructional asset.

Perhaps most importantly, students become contributors to the learning environment rather than passive recipients of review materials. Their knowledge and experiences shape a resource that can support subsequent cohorts. In this respect, StockBingo functions as both a cumulative review exercise and a small knowledge-management system embedded within the course.

StockBingo has been used in the undergraduate MIS course since 2019. Across successive course offerings, students have provided positive informal feedback about the exercise. These classroom experiences have supported continued use and refinement of the activity, including its clue repository, pacing, and verification procedures. Because the feedback was informal rather than collected through a systematic research design, it is presented as implementation history rather than evidence of causal effects on learning, engagement, or retention.

VIII. LIMITATIONS AND FUTURE EVALUATION

This article describes an instructor-developed teaching activity rather than a controlled evaluation of learning outcomes. Claims regarding engagement, participation, or retention should therefore be interpreted as design intentions rather than established causal findings.

Future research could compare company identification before and after participation, evaluate performance on course examinations, analyze the quality and characteristics of submitted clues, or compare StockBingo with traditional review formats. Researchers might also investigate which design features contribute most strongly to student participation and perceived learning. Any study involving identifiable student data should receive appropriate institutional review and approval.

IX. CONCLUSION

StockBingo transforms a cumulative MIS review into a collaborative but individually accountable retrieval-practice exercise. Randomized bingo sheets, varied clues, multiple winning categories, QR-based verification, and faculty-curated student contributions create a structured and adaptable learning experience. Beyond gameplay, the activity converts student expertise into a renewable instructional resource that can evolve across successive course offerings.

X. GENERATIVE AI USE DISCLOSURE

The author used Microsoft Copilot to assist with organizing and editing the manuscript. All software, gameplay mechanics, instructional procedures, and classroom implementation described in this article were created by the author before generative AI tools were used. The author verified and assumes responsibility for the manuscript.

International Journal of Business and Applied Social Science

E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3

https://creativecommons.org/licenses/by/4.0/

Check for Updates

CPER

Original Article | Open Access | Peer Reviewed

References

1. Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. Psychological Science in the Public Interest, 14(1), 4-58. https://doi.org/10.1177/1529100612453266
2. Li, M., Ma, S., & Shi, Y. (2023). Examining the effectiveness of gamification as a tool promoting teaching and learning in educational settings: A meta-analysis. Frontiers in Psychology, 14, 1253549. https://doi.org/10.3389/fpsyg.2023.1253549
3. Roediger, H. L., III, & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. Psychological Science, 17(3), 249-255. https://doi.org/10.1111/j.1467-9280.2006.01693.x
4. Sharma, M., Ma, Y., & Sana, F. (2023). Harnessing student-generated questions as a learning strategy. In Proceedings of the 17th International Conference of the Learning Sciences (pp. 1561-1564).
5. Wu, L., Liu, Y., How, M.-L., & He, S. (2023). Investigating student-generated questioning in a technology-enabled elementary science classroom: A case study. Education Sciences, 13(2), 158. https://doi.org/10.3390/educsci13020158
6. Zeng, J., Sun, D., Looi, C.-K., & Fan, A. C. W. (2024). Exploring the impact of gamification on students' academic performance: A comprehensive meta-analysis of studies from the year 2008 to 2023. British Journal of Educational Technology, 55, 2478-2502. https://doi.org/10.1111/bjet.13471

APPENDIX A. SOFTWARE SETUP AND OPERATING GUIDE

This appendix describes the software-supported implementation used for StockBingo. The original application is a native macOS application written in Swift. It generates unique bingo sheets, assigns QR codes, manages clue delivery, and validates winning patterns. Instructors using a different bingo platform may follow the same instructional sequence while substituting an alternative method for card generation and winner verification.

A1. Required Resources

- A Mac computer capable of running the instructor's StockBingo application. The Mac application is available from the author.
- A pool of publicly traded companies and their stock ticker symbols.
- At least one faculty-approved clue for each company in the pool.
- A printer or electronic distribution method for individualized bingo sheets.
- A camera-enabled device for scanning the QR code on a claimed winning sheet. You could also see the list of stocks called in on the right side of the screen. It is initially hidden but can be toggled to show or not to show.
- A classroom display or other method for presenting clues at a controlled pace.

A2. Prepare the Company and Clue Repository

1. Assemble the companies studied during the semester and verify each company's ticker symbol.
2. Associate each company with one or more concise clues addressing products, technologies, strategies, history, branding, executives, locations, or business events.
3. Review every clue for accuracy, currency, reasonable difficulty, and a single intended answer.
4. Remove the company name and ticker symbol from clue wording.
5. Retain additional approved clues so the repository can be refreshed across course offerings.

A3. Generate and Distribute Bingo Sheets

1. Use the application to generate an individualized bingo sheet for each student.
2. Confirm that each sheet contains stock tickers drawn from the course company pool.
3. Confirm that each sheet has a readable QR code used to reconstruct and validate that sheet.
4. Print the sheets or distribute them in the format supported by the local implementation.
5. Keep the generated sheet records available during gameplay so that winning claims can be verified.

International Journal of Business and Applied Social Science

E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3

https://creativecommons.org/licenses/by/4.0/

Check for Updates

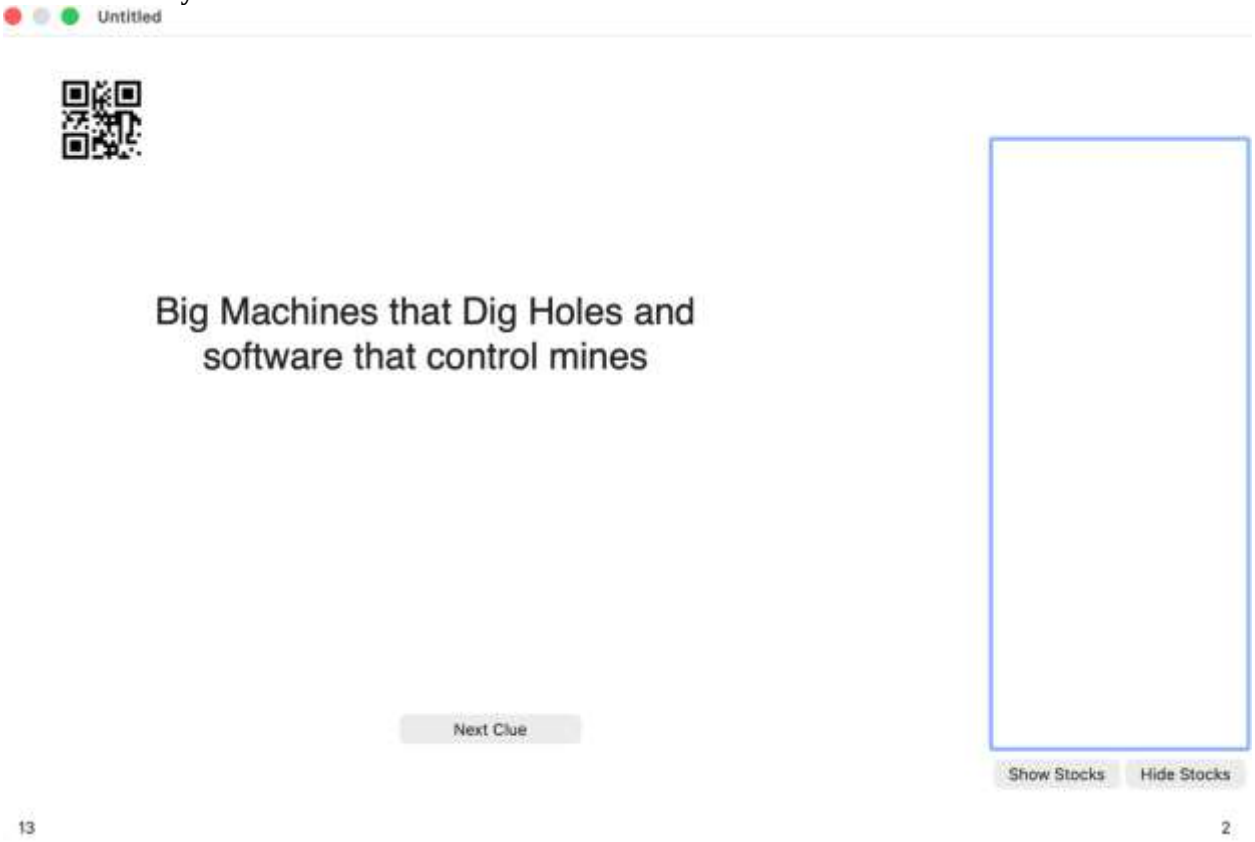
CPER

Original Article | Open Access | Peer Reviewed

A4. Configure the Classroom Session

Setting	Recommended configuration
Preparation period	Approximately five minutes for students to review their sheets and identify unfamiliar ticker symbols or companies.
Clue pace	Approximately one clue every 20 seconds.
Review pauses	Pause briefly after every 20 clues so students can review sheets and discuss uncertain answers.
Collaboration	Students may discuss clues, but each student remains responsible for an individual sheet and an individual winning claim.
Winning categories	The first verified M-pattern, I-pattern, S-pattern, and blackout each produce one winner.

A5. Present Clues and Verify Winners



1. Present clues one at a time at the announced pace.
2. Allow students to discuss possible answers while monitoring their own sheets.
3. When a student claims a pattern, scan the QR code printed on the sheet.
4. Use the software's reconstructed sheet and clue history to determine whether all required companies have been presented.
5. Confirm the winner only when the claimed pattern is valid; otherwise, resume gameplay.
6. Continue until the announced winning categories have been completed or the available class time has ended.

A6. Post-Session Repository Maintenance

1. Invite students to submit new or revised clues based on their company research.
2. Review proposed clues using the acceptance criteria provided in the manuscript.
3. Edit or reject clues that are ambiguous, overly obscure, dated, duplicative, or factually inaccurate.
4. Add accepted clues to the repository for future course offerings.

A7. Alternative Implementation Without the Native Application

Instructors who do not have access to the native macOS application may reproduce the exercise with a commercially available bingo-card generator. The substitute process should still provide randomized individual cards, a record of the clues already presented, and a transparent method for verifying a claimed pattern. QR-code validation is useful but is not required to preserve the exercise's retrieval-practice structure.

International Journal of Business and Applied Social Science

E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3

https://creativecommons.org/licenses/by/4.0/

Check for Updates

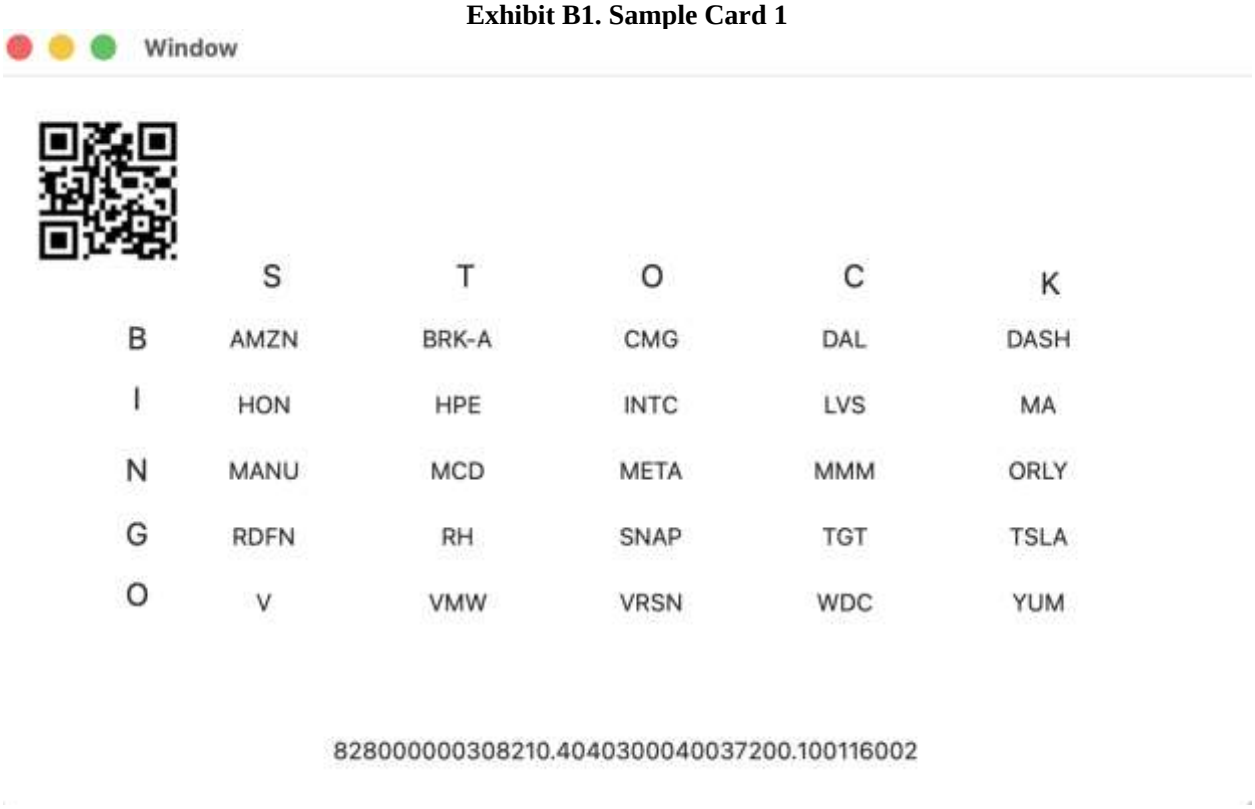
CPER

Original Article | Open Access | Peer Reviewed

APPENDIX B. SAMPLE STOCKBINGO CARDS

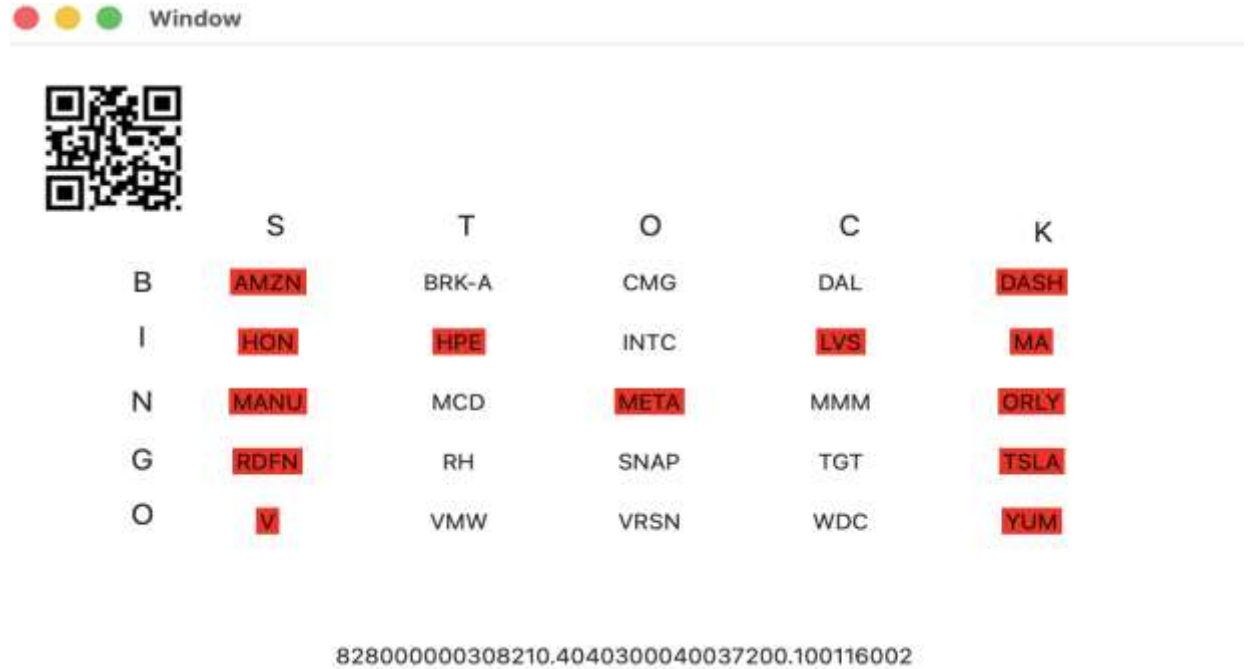
The following sample cards illustrate the format of individualized StockBingo sheets. Each square contains a stock ticker associated with a company studied during the course. The center square is free. In actual use, the application randomizes ticker placement and assigns a QR code to each generated sheet for validation.

Exhibit B1. Sample Card 1



Sample Winning Patterns

Pattern	Requirement
M-pattern	Marked squares form the letter M on the card.
I-pattern	Marked squares form the letter I on the card.
S-pattern	Marked squares form the letter S on the card.
Blackout	Every non-free square is marked.



International Journal of Business and Applied Social Science

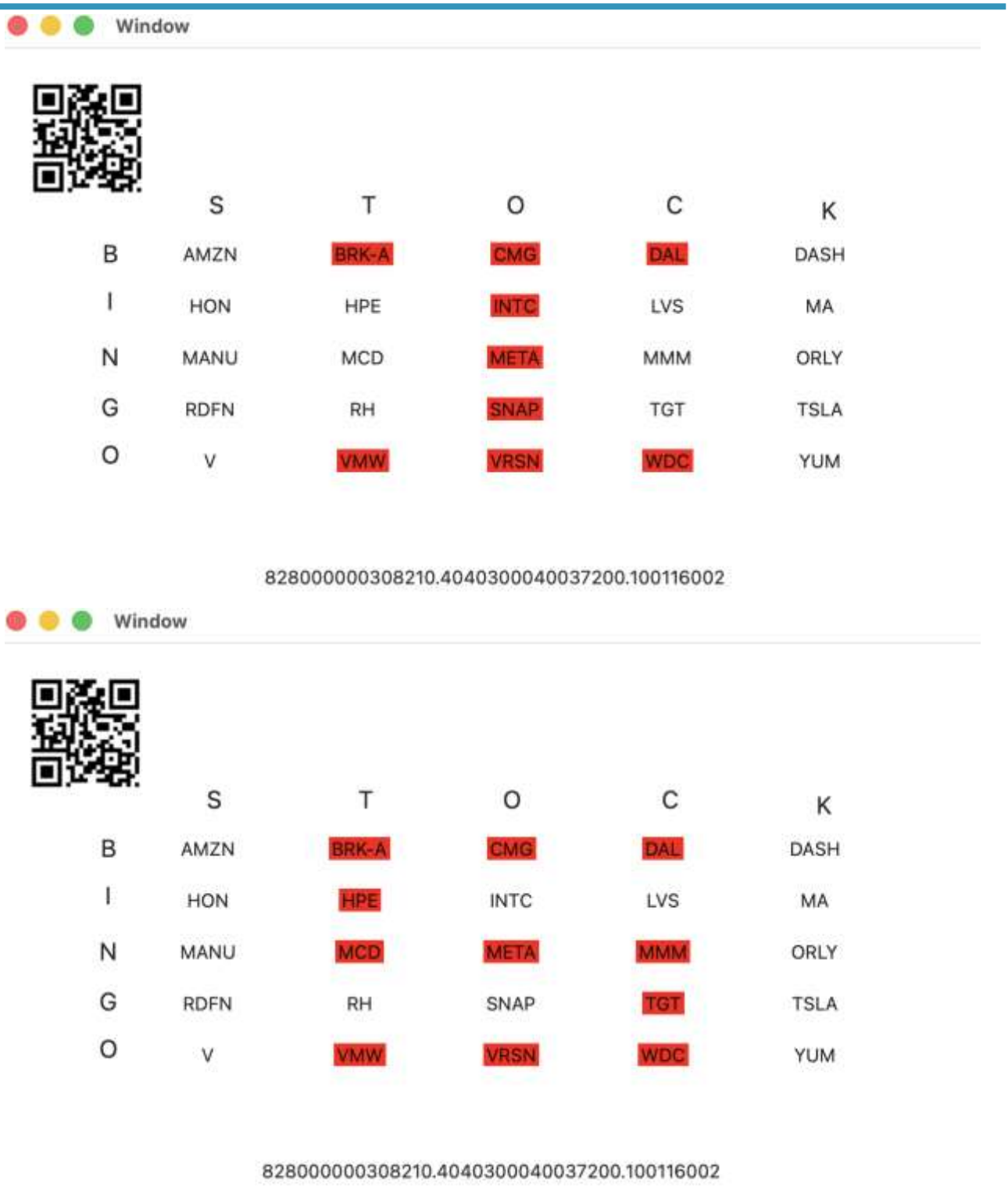
E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3

https://creativecommons.org/licenses/by/4.0/

Check for Updates

CPER

Original Article | Open Access | Peer Reviewed



Instructor note. The sample tickers are illustrative. Instructors should generate cards from the companies actually covered in their course and should verify company names, ticker symbols,
and clues before use.

International Journal of Business and Applied Social Science

E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3

https://creativecommons.org/licenses/by/4.0/

Check for Updates

CPER

Original Article | Open Access | Peer Reviewed

APPENDIX C. SAMPLE CLUE BANK

The clue bank below illustrates the range and brevity appropriate for timed delivery. It is intended as a model rather than a required company list. Before using any clue, instructors should verify that it remains accurate and that the company was meaningfully addressed in the course.

Answer (ticker)	Sample clue
AAPL	This company markets the iPhone, iPad, Mac, and Apple Watch.
MSFT	This company develops Windows, Microsoft 365, Azure, and Xbox.
AMZN	This company combines a large online marketplace with the AWS cloud-computing business.
GOOGL	This company's businesses include Google Search, YouTube, Android, and Google Cloud.
META	This company operates Facebook, Instagram, and WhatsApp.
NVDA	This company is widely associated with graphics processors used in gaming and artificial-intelligence computing.
WMT	This retailer operates Walmart stores and Sam's Club.
DIS	This entertainment company's properties include Disney, Pixar, Marvel, and theme parks.
KO	This company's flagship product is a globally recognized cola beverage.
NKE	This athletic footwear and apparel company uses the Swoosh logo.
SBUX	This company operates a global coffeehouse chain.
IBM	This long-established technology company is associated with enterprise computing, consulting, and the Watson brand.
ORCL	This enterprise technology company is strongly associated with database software and cloud applications.
CRM	This company provides the Salesforce customer-relationship-management platform.
ADBE	This company develops Photoshop, Acrobat, Illustrator, and Creative Cloud.
INTC	This semiconductor company is known for processors used in personal computers and servers.
CSCO	This company supplies networking hardware and related enterprise technologies.
PYPL	This company provides a digital payments platform and has owned the Venmo service.
UBER	This platform company is associated with ride-hailing and food delivery.
ABNB	This platform connects guests with short-term lodging offered by hosts.
COST	This membership-based warehouse retailer is known for bulk merchandise and annual membership fees.
TGT	This U.S. retailer is recognized by a red bullseye logo.
NFLX	This company evolved from mailed DVD rentals into subscription video streaming.
TSLA	This company produces electric vehicles and energy-storage products.

Clue-Quality Checklist

- The clue identifies one intended company.
- The clue is factually accurate and current.
- The clue draws on course-relevant knowledge rather than obscure trivia.
- The wording is concise enough for timed presentation.
- The company name and ticker are not disclosed in the clue.
- The clue differs meaningfully from existing repository entries.
- The clue provides a memorable retrieval cue.

International Journal of Business and Applied Social Science

E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3

https://creativecommons.org/licenses/by/4.0/

Check for Updates

CPER

Original Article | Open Access | Peer Reviewed

APPENDIX D. REPRODUCIBLE INSTRUCTOR AND STUDENT HANDOUTS

Exhibit D1. StockBingo Instructor Quick-Start Guide

Purpose

StockBingo is a retrieval-practice activity in which students identify course companies from instructor- and student-authored clues and mark the corresponding stock tickers on individualized bingo sheets. The activity combines collaboration with individual accountability and concludes with faculty verification of claimed winning patterns.

Learning Objectives

- Identify companies from clues concerning products, technologies, strategies, histories, or market events.
- Connect stock ticker symbols with the corresponding companies.
- Retrieve and integrate company knowledge accumulated throughout the semester.
- Evaluate the effectiveness of instructional clues.
- Create concise company clues based on research and course knowledge.

Preparation Checklist

- Verify the company and ticker pool.
- Review the clue repository for accuracy, currency, uniqueness, and appropriate difficulty.
- Generate one individualized, QR-coded bingo sheet for each student.
- Prepare the application and QR-scanning device.
- Announce the winning categories and any incentive before gameplay.
- Allow approximately five minutes for students to review their sheets.

Facilitation Sequence

1. Distribute one individualized sheet to each student.
2. Explain that collaboration is permitted, but each student is responsible for an individual sheet.
3. Present approximately one clue every 20 seconds.
4. Pause briefly after every 20 clues for review and discussion.
5. Scan the QR code when a student claims an M-pattern, I-pattern, S-pattern, or blackout.
6. Confirm the claim only if the application shows that all required companies have been presented.
7. Conduct a brief debrief focused on memorable, confusing, overly easy, or overly obscure clues.
8. Invite students to submit new or improved clues for faculty review.

Debrief Prompts

- Which clues were easiest to recognize, and why?
- Which clues created confusion?
- Which clues depended on broad course knowledge rather than specialized trivia?
- What made a clue memorable?
- How could an ambiguous or overly difficult clue be improved?

Exhibit D2. StockBingo Student Handout

Purpose

StockBingo is a cumulative course-review activity. You will listen to clues about companies studied during the semester, identify the intended company, and mark its stock ticker on your individual bingo sheet. You may collaborate with classmates, but you are responsible for monitoring your own sheet and claiming your own win.

How to Play

1. Review the ticker symbols on your sheet during the preparation period. You may consult permitted course materials during this period.
2. Listen to each clue and determine which company it identifies.
3. Locate and mark the company's ticker if it appears on your sheet.
4. Collaborate with classmates when helpful, but continue monitoring your own sheet.
5. Call for verification when your marked spaces form one of the announced winning patterns.
6. Present the QR code on your sheet so the instructor can validate the claim.
7. Continue participating after an early winner because additional winning categories remain available.

International Journal of Business and Applied Social Science

E-ISSN: 2469-6501 VOL: 12, ISSUE: 10 October/2026
DOI: http://doi.org/10.33642/ijbass.v12n10p3

https://creativecommons.org/licenses/by/4.0/

Check for Updates

CPER

Original Article | Open Access | Peer Reviewed

Winning Categories

Category	Winning condition
M-pattern	Your marked spaces form the announced M configuration.
I-pattern	Your marked spaces form the announced I configuration.
S-pattern	Your marked spaces form the announced S configuration.
Blackout	All required spaces on your card are marked.

After Gameplay

During the debrief, be prepared to discuss which clues were memorable, confusing, too easy, or too obscure. You may also propose a new or revised clue based on your company research. Any clue added to the future repository will be reviewed and approved by the instructor.

Optional Student Clue Submission

Company and ticker	
Proposed clue	
Course connection	
Why the clue is distinctive	
Sources checked for accuracy	