

The Game is Afoot: Using Tabletop Games to Understand Security and Privacy

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Abstract

In spite of a growing addiction to screens and video games, Tabletop Role-playing Games (TTRPG) and card games are experiencing a golden age of popularity. Though Capture the Flag (CTF) games on online platforms are a mainstay of cybersecurity education, the use of tabletop games is not. This research examines how interaction with TTRPG and also the game design process can yield a better understanding of security and privacy concepts. Furthermore, inclusion of underrepresented populations into game design can yield game content more inclusive to that population.

1. Introduction

Gamification, or using game-type elements in non-gaming contexts, has the potential to improve user experience and engagement [16]. Electronic versions of Capture the Flag (CTF) contests have been adopted as a popular gaming model in the cybersecurity community and cybersecurity education [36]. The games are used to develop and exercise cybersecurity skills and recruit [28]. These contests generally feature a complex online framework to house the challenges and keep score [32]. The complex setup requires significant technical expertise/administration.

Like the rest of cybersecurity, CTF contests typically attract fewer underrepresented minorities [32]. The games reflect the interests of the designers, who are usually established cybersecurity professionals rather than underrepresented minorities [21].

In contrast to the CTF games based online, board games feature a face-to-face experience. In the aftermath of the isolation of quarantine, the appeal of in-person gaming has increased [44]. Even before the COVID-19 pandemic, board games experienced a new era of popularity [33]. Board game cafes have sprung up to meet the demand of a younger generations devoted to the board game experience [43]. Consequently the board game provides appealing experience to a wide demographic [44].

Red-Blue challenges are common exercises used in security training and education [15]. Tabletop exercises are a common

technique to prepare for incident response [31]. This approach combines these classic education techniques with gamification.

Typically games used in education have been developed by educators and delivered to learning communities [9, 12]. But Bloom's taxonomy of the six levels of learning assigns the highest level of learning longevity to activities involving creating or teaching [2]. To engage the critical thinking skills of the participants, the game content for the study is built by the participants. By using a low-tech medium to deliver the game content, this approach frees the participants to use their creativity to devise the challenges.

Game-Based Learning (GBL) and gamification are not new concepts in education and training. Gamification is defined as applying game mechanics to non-game contexts [4]. Motivation can be achieved by rewards such as points and badges like video games [38]. But gamification can also be achieved by applying elements from board games.

2. Background

The approach in this research is based on the history of classic board games and their use in education, the use of TTRPG in education, and the sparsity of existing games in cybersecurity and privacy.

2.1. Classic Board Games as teaching tools

Two of the best-known classic board games, Monopoly and Candyland, were originally developed as teaching tools. The first version of the Landlord's Game (aka Monopoly) or was patented by Elizabeth Magie in 1903 after years of development [34]. The original published version had two sets of rules. A cooperative set rewarded all participants when wealth were created. A monopolist set rewarded a player who created monopolies and crushed opponents. The game was popular on college campuses as a tool to teach fiscal responsibility and economics.

The origins of Candyland are more bittersweet. A school-teacher named Eleanor Abbott created the game while recovering from paralytic poliomyelitis (aka polio). Before a vaccine became common, polio was a frightening and crippling disease that required a breathing apparatus known as an iron lung to keep the paralyzed victims alive [27]. Victims of polio suffered as much from their confinement in the

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apparatus as from the disease. The game was used for therapeutic purposes to entertain the children recuperating from polio.

Both games continue to be used for educational and therapeutic purposes. Monopoly has been used to teach accounting concepts at University of Southern Indiana [39]. Candyland has been used in play therapy to teach young children how to express their feelings [42].

2.2 TTRPG and Education

The first commercially available tabletop role-playing game was Dungeons and Dragons (D&D) created in 1974 [18]. This represented an evolution from the previous board game structure by adding collaboration amongst the participants as well as improvisational dialogue in character. This collaborative storytelling element can also strengthen communication skills and innovational thinking [3].

TTRPGs have been created within the educational space. Studying literature in a middle school through a TTRPG has shown that the game documents require a certain amount of creative writing [14]. Strategies for recording game status are key to allow continuation of the TTRPG in another class session. This is similar to the typical D&D campaign that may stop and resume over a series of months.

In Ireland, Cardinot and Fairfield created a board game to teach physics and astronomy at the post-primary level [9]. The learning objectives were driven by national Irish Science Syllabus. The TTRPG is also being used for adult education to explore how to solve problems [6].

Technology is defined as something imbued with purpose, function or benefit that intelligent species can appreciate [10]. By this definition a TTRPG is technology. The humanities have been notoriously slow adopting digital tools for understanding concepts [40]. Conversely, though the sciences wholeheartedly embraced online platforms, character-based education is not prevalent [32]. TTRPG has successfully been used as a “technology” in both disciplines.

2.3 Existing Cybersecurity and privacy games

Within the cybersecurity community the CTF model has been most popular [28]. The participants work individually or form teams to solve cybersecurity primarily on an online platform. There is little to no collaboration between teams. Typically the challenge puts the participant in the role of the attacker of a system (Red Team). The participant earns points for each challenge based on speed to solution, and difficulty of the challenge.

Because of the complexity needed for a CTF environment, open-source is an attractive option to building from scratch [25]. The virtual CTF environments available as open

source vary in their functionality and win conditions, making the selection and setup a non-trivial exercise even for technology experts.

The games to teach data privacy are more rudimentary. The ones aimed at children consist of a series of puzzles and self-driven activities [23] or discussion points [8].

3. Research Problem and Objectives

The literature shows evidence of TTRPG being an effective tool for understanding both science and literary information in an educational or training setting [9, 14]. It also supports the value of the collaborative nature of TTRPG in problem-solving, developing communication skills, and engaging the participants. But in the security and privacy space it shows minimal use of collaborative games and TTRPG. Subsequently, the research problem is to explore the design of TTRPG to understand and interpret knowledge in security and privacy. This leads to the research objectives shown in Figure 1.

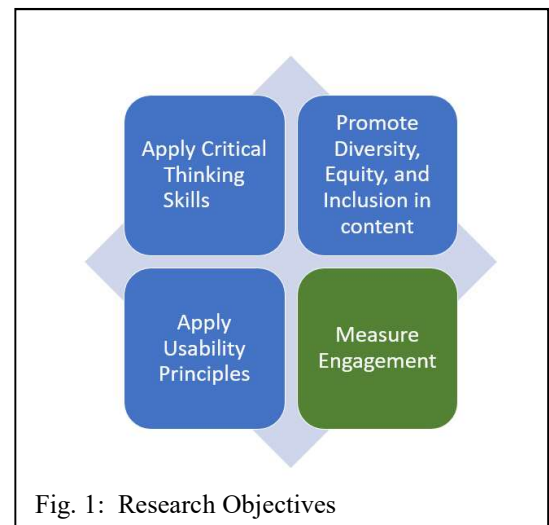


Fig. 1: Research Objectives

The first three objectives relate to the design of the games. The fourth looks at the engagement of the subjects with the design.

3.1 Design Research Objectives

The first objective is to provide an avenue to apply critical thinking skills to security and privacy problems. The TTRPG model encourages innovative thinking instead of rote responses typical of a quiz-based game. These skills are also much valued by the business community in their workforce [1].

The second research objective is to design diversity, equity, and inclusion into the content and game mechanics.

Women and underrepresented minorities have not been attracted to cybersecurity programs and computer science in general, resulting in a lack of diversity in the potential workforce [24]. One way to reach underrepresented groups, is provide learning options that reduce cultural bias [20]. Cybersecurity education researchers Codish and Ravid advocated for adaptive game framework that allows a game to be tailored to users of the game [13]. A tailored game has greater potential for enjoyment and engagement, which is key both in cybersecurity education and recruitment [46].

Games in general have typically reflect the gendered bias of the designers in the portrayal of characters, and in the style of activities [17]. Putting underrepresented minorities in the designer’s role has resulted in designs that are more inclusive for all [47]. The nature of TTRPG creative collaboration provides a natural space for inclusive content. All the participants take on the designer’s role.

The third research objective is to apply security usability principles to the game design and content mapping. Because of the limited time typically available in both the educational and training setting, the game design model must be easy to understand, maintain, and play.

3.2 Gameplay Objective

The fourth research objective is to provide a measure of how well the games engage the target population. Engagement is key to understanding the security and privacy concepts being explored in the game.

3.3 Measuring the Design

Evaluating design is typically a qualitative process. These measures are proposed to give a numeric metric to design. Critical thinking of the first objectives involves the ability to execute, synthesize, recommend, and generate [45]. The storytelling nature of TTRPG lends itself to exercising these abilities. The procedure for creating content in the game design will require the use of these abilities. The components are recorded in a Google form which prompts for a completeness. Each successfully created component increases the score for critical thinking skills.

The second goal for DEI in content is a tricky measure [11]. Science, technology, engineering, and mathematics (STEM) disciplines, including security and privacy, were founded by a population primarily white, male, heterosexual and able-bodied [26]. Two key indicators of DEI are representation and content wording [7]. For the purposes of this research the representation measure is based on the demographics of the participants in the research.

Though gender bias has been recognized in data collection and research emphasis [35, 37], tools to measure and correct bias are more rudimentary. Microsoft Word 365 will suggest changes for inclusive language [48]. The insights of Gaucher

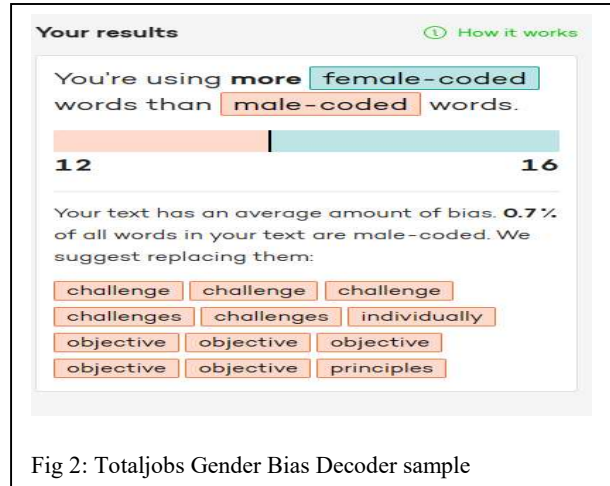


Fig 2: Totaljobs Gender Bias Decoder sample

et al study which provided evidence of gender bias in job descriptions [19] have been adapted to create the Totaljobs Gender Bias Decoder tool. (Fig 2) The content created for the game will be scored using the tool.

The third goal for security usability is measured by mapping the elements of the TTRPG against combined security-usability principles [22]. This heuristic evaluation technique is common to diagnose usability problems in general [30] and also in video game interfaces [41]. Each principle receives an implementation score ranging from 0 to 2. Zero indicates the absence of the design principle, 1 indicates partial implementation, and 2 indicates complete implementation.

3.3 Measuring the Engagement

In Al-Bashayreh et al the factors of perceived enjoyment (PE) and perceived playfulness (PP) present in mobile learning apps are examined as a predictor of an intention to use [29]. This theoretical model has also been used to analyze mobile learning attitude during the pandemic [5]. Looking at TRPG as technology, whose essence is playfulness and enjoyment,

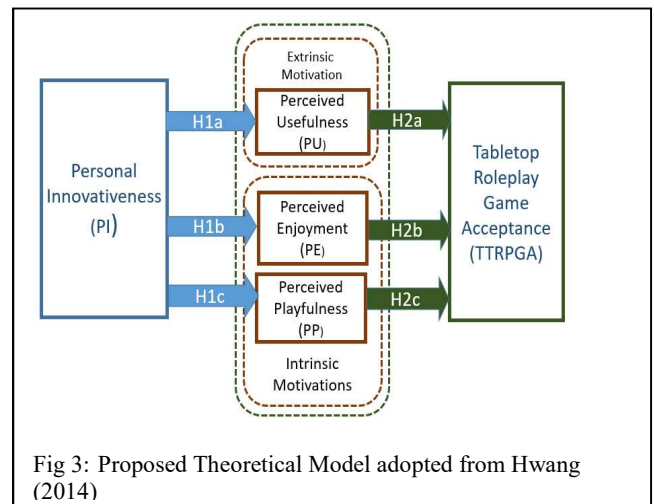


Fig 3: Proposed Theoretical Model adopted from Hwang (2014)

These same factors could be used as a determinant of acceptance of and engagement with the game.

Previously Hwang (2014) looked at personal innovativeness as it related to usage of Enterprise Resource Planning (ERP) systems. The factors of PU, PE, and PP were proposed to predict eventual system usage. This model was adapted as shown in Figure 3 shows TTRPG Acceptance based on PI, PU, PE, and PP. This leads to the research questions and hypotheses shown in Table 1.

Table 1: Research Questions and Hypotheses.

Research Questions	Hypotheses
RQ1: What are the factors TTRPG acceptance/engagement?	<p>H₀1: PU, PE, and PP positively and significantly influence TTRPGA.</p> <p>H1a: PI will positively and significantly influence PU.</p> <p>H1b: PI will positively and significantly influence PE.</p> <p>H1c: PI will positively and significantly influence PP.</p> <p>H2a: PU will positively and significantly influence TTRPGA.</p> <p>H2b: PE will positively and significantly influence TTRPGA.</p> <p>H2c: PP will positively and significantly influence TTRPGA.</p>
RQ2: Does the proposed design of TTRPG meet needs for critical thinking, DEI, and usability?	<p>H3a: Design team composition will positively influence content to demonstrate DEI.</p> <p>H3b: Creating a TTRPG with security and privacy content deploys critical thinking skills</p> <p>H3c: Principles of security-usability design can be successfully applied to TTRPG design.</p>

4. Research Design and Procedure

The subject participants were charged with creating the content and game mechanics for a TTRPG that required the participants to solve security challenges. The premise of the game placed the participants in the role of a Blue team (defensive) during the design process and the Red Team (offensive) during the gameplay.

The participants were divided into two teams. The content was designed and written over a two-week period using a dashboard created with Google Drive collaboration tools. (Fig. 4) The universal access of the Google Drive makes the design materials inclusively available. The functionality of Google forms, spreadsheets, and documents collects data about contributions and ensures content meets the requirements for participation and tracks completeness. Thus, the collaboration platform served two research objectives.

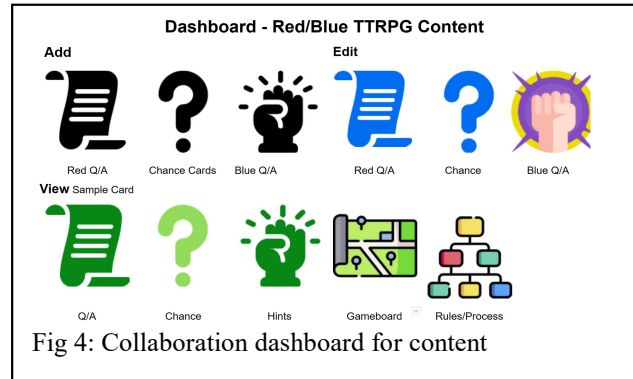


Fig 4: Collaboration dashboard for content

4.1 Game Mechanics

The classic games of Monopoly, Candyland, and Dungeons & Dragons (DnD) inspired the game mechanics. Like Candyland, the players used tokens to follow a winding path to noted landmarks. Certain places on the path were marked with the letter C. Like Monopoly, players drew a card that described positive or negative situations. The movement of players was set by a 12-sided polyhedral die from DnD and players interacted in characters based on their game persona.

A rulebook was created prior to gameplay to determine the win conditions, how points were awarded, and how teams were allowed to collaborate. As play progressed during the pilot, additional rules were created. The game board was a

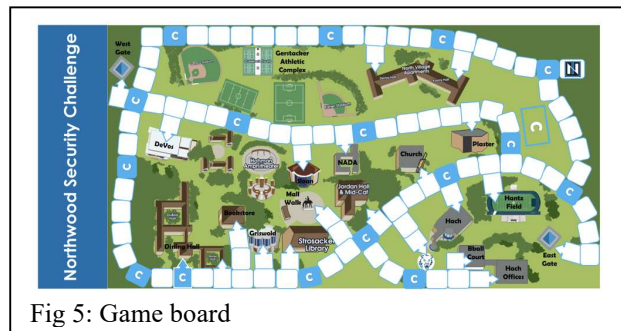


Fig 5: Game board

representation of a university campus with which all the participants were familiar. (Fig. 5)

4.2 Game Content

While in their design role, each team create three challenges for their opponents. The challenges were based on physical, operational, or logical security. Each challenge was required to have at least 3 steps, and points were awarded for solving each step. Designers also provided hints which cost solving team points if they were used.

Both teams collaborated on the rulebook and the random situation (“chance”) cards. These cards often involved humorous interaction between characters in the game, or with specific locations on the board.

4.3 Game Play

The participants played the game over two class sessions. To preserve progress, the position of the players and the status of the completed challenges were saved. When all the game play completed, the assessment questionnaire was administered.

5. Selected Preliminary Results and Discussion

The pilot for this study was run spring semester of 2023. Data for the engagement section was collected using a survey in Google forms. Questions in the survey were mapped to specific hypotheses to determine whether hypotheses were supported or not.

The participants were undergraduate students majoring in STEM. 50% of the students represented the typical STEM demographic of white heterosexual males 18-24. The other 50% represented Black, Latino, biracial, women, LGBTQ+ and/or were of mature age. (24-45 years old)

According the content analysis for gender bias, the content created by all participants was 0.2% male-coded. The content created by the all-male team was 3.5% male-coded, while the mixed gender team scored 1.7% male-coded.

In terms of engagement PE, PU, PP were all strongly supported. (Table 2) In addition, all participants reported an increase in expertise related to cybersecurity of varying degrees. Though the subjects reported engagement with the games format, they felt strongly that it would not make them forget to do their work.

The comments from the participants showed clear enthusiasm for the approach. It was frequently stated that creating the game enhanced their grasp of concepts. In addition the board game as a metaphor was easy to understand, thus satisfying a key usability principle. The board game speaks to this group of subjects, which is diverse in age and background.

Table 2 – PE, PU, PP Results

Construct	Agree/ Strongly Agree	Disagree/ Strongly Disagree
PE All items	100%	0%
PU		
Easier	96%	0%
Effective	91%	0%
Control	72%	0%
Useful	100%	0%
PP		
Forget time	77%	0%
Forget work	18%	36%
Enjoyment	90%	0%
Curiosity	91%	0%
Exploration	82%	18%

6. Future work and discussion

Better tools for content bias are needed. It is possible harnessing AI can expand the analysis further than job postings.

Though usability is measured in the design phase through heuristic evaluation, a usability measurement during the engagement phase would also be of interest. While having the players design the game in the manner of TTRPG positively impacts engagement, it does not promote objectivity in usability assessment. Separate participant groups with similar and dissimilar demographics could be recruited to play through and rate usability.

7. References

- [1] Adams, M. and Makramalla, M. Cybersecurity Skills Training: An Attacker-Centric Gamified Approach. *Technology Innovation Management Review*, 5, 1 (2015 2015).
- [2] Amira, T., Lamia, M. and Mohamed, H. Flipped classroom for algorithmic teaching. *Proceedings of the 2nd International Conference on Networking, Information Systems & Security* (2019), 1-4.
- [3] Atamdede, A. *Collaborative Storytelling: Composition Pedagogy and Communal Benefits of Narrative Innovation*. ProQuest Dissertations Publishing, 2021.
- [4] Attali, Y. and Arieli-Attali, M. Gamification in assessment: Do points affect test performance? *Computers & Education*, 83 (2015), 57-63.

- [5] Bhatnagar, N. and Horcher, A.-M. Mid-Pandemic Impact on Mobile Learning Motivation Factors. *Information Systems Education Journal*, 21, 2 (2023), 2.
- [6] Boghian, I., Venera-Mihaela, C., Popescu, C. V. and Măță, L. Game-based learning. Using board games in adult education. *Journal of Educational Sciences and Psychology*, IX (LXXI), 1 (2019 2019).
- [7] Brancaccio-Taras, L., Awong-Taylor, J., Linden, M., Marley, K., Reiness, C. G. and Uzman, J. A. The PULSE Diversity Equity and Inclusion (DEI) Rubric: a Tool To Help Assess Departmental DEI Efforts. *Journal of microbiology & biology education*, 23, 3 (Dec 2022).
- [8] Breazeal, C. *Family-Friendly Data Privacy + AI Activities: Interactive lessons to help kids learn and design with data privacy in mind – MIT Media Lab*. 2023.[Online] Available: <https://www.media.mit.edu/posts/family-friendly-data-privacy-ai-activities-interactive-lessons-to-help-kids-learn-and-design-with-data-privacy-in-mind>.
- [9] Cardinot, A. and Fairfield, J. A. *Game-based learning to engage students with physics and astronomy using a board game*. IGI Global, 2022.
- [10] Carroll, L. S. L. A comprehensive definition of technology from an ethological perspective. *Social Sciences*, 6, 4 (2017), 126.
- [11] Chaudhry, S. Measuring diversity, equity and inclusion: a holistic approach. *Development and Learning in Organizations: An International Journal*, 37, 2 (2023), 4-6.
- [12] Chavez, B., Gilliam, E. H., Pathak, R. and Volino, L. R. Popular game shows as educational tools in the pharmacy classroom. *Currents in Pharmacy Teaching and Learning*, 4, 2 (4// 2012), 146-149.
- [13] Codish, D. and Ravid, G. Adaptive Approach for Gamification Optimization. *Proceedings of the 2014 IEEE/ACM 7th International Conference on Utility and Cloud Computing* (2014), 609-610.
- [14] Cook, M. P., Gremo, M. and Morgan, R. Playing Around with Literature: Tabletop Role-Playing Games in Middle Grades ELA. *Voices From the Middle*, 25, 2 (Dec 2017 2017-12-13 2017), 62-69.
- [15] DeCusatis, C., Bavaro, J., Cannistraci, T., Griffin, B., Jenkins, J. and Ronan, M. Red-blue team exercises for cybersecurity training during a pandemic. *2021 IEEE 11th Annual Computing and Communication Workshop and Conference (CCWC)* (27-30 Jan. 2021 2021), 1055-1060.
- [16] Deterding, S., Sicart, M., Nacke, L., O'Hara, K. and Dixon, D. Gamification. using game-design elements in non-gaming contexts. *CHI '11 Extended Abstracts on Human Factors in Computing Systems* (2011), 2425-2428.
- [17] Gao, G., Min, A. and Shih, P. C. Gendered design bias: gender differences of in-game character choice and playing style in league of legends. *Proceedings of the 29th Australian Conference on Computer-Human Interaction* (2017), 307-317.
- [18] Garcia, A. Privilege, power, and Dungeons & Dragons: How systems shape racial and gender identities in tabletop role-playing games. *Mind, Culture, and Activity*, 24, 3 (2017), 232-246.
- [19] Gaucher, D., Friesen, J. and Kay, A. C. Evidence that gendered wording in job advertisements exists and sustains gender inequality. *Journal of personality and social psychology*, 101, 1 (2011), 109.
- [20] Gorka, S., McNett, A., Miller, J. R. and Webb, B. M. Improving the Cybersecurity and Information Assurance Pipeline: Impact of High School After-School Program. *Proceedings of the 20th Annual SIG Conference on Information Technology Education* (2019), 156-156.
- [21] Guzman, E., Oliveira, L., Steiner, Y., Wagner, L. C. and Glinz, M. User feedback in the app store: a cross-cultural study. *Proceedings of the 40th International Conference on Software Engineering: Software Engineering in Society* (2018), 13-22.
- [22] Horcher, A.-M. and Dula, W. Usability is Not the Dark Side: Secure Usable Design Seen through Star Wars. *Proceedings of the Symposium on Usable Privacy and Security (SOUPS) 2019* (2019).
- [23] Information and Privacy Commissioner of Ontario *Privacy Pursuit! Games and Activities for Kids*. 2021.[Online] Available: https://iapp.org/media/pdf/resource_center/privacy_pursuit_games_and_activities_for_kids.pdf.
- [24] Kirkpatrick, M. S. and Mayfield, C. Evaluating an Alternative CS1 for Students with Prior Programming Experience. *Proceedings of the 2017 ACM SIGCSE Technical Symposium on Computer Science Education* (2017), 333-338.
- [25] Kucek, S. and Leitner, M. An Empirical Survey of Functions and Configurations of Open-Source Capture the Flag (CTF) Environments. *Journal of network and computer applications*, 151 (2020), 102470.
- [26] Leibnitz, G. M., Peters, J. W., Campbell-Montalvo, R., Metcalf, H., Lucy Putwen, A., Gillian-Daniel, D. L., Sims, E. L. and Segarra, V. A. Refining a DEI Assessment Tool for Use in Optimizing Professional STEM Societies for Gender Equity. *Frontiers in sociology*, 7 (2022), 755372.
- [27] Maxwell, J. H. The iron lung: halfway technology or necessary step? *The Milbank Quarterly* (1986), 3-29.
- [28] McDaniel, L., Talvi, E. and Hay, B. Capture the Flag as Cyber Security Introduction. *2016 49th Hawaii International Conference on System Sciences (HICSS)* (5-8 Jan. 2016 2016), 5479-5486.
- [29] Natchez, M. and Prose, T. Creating effective hypercard online documentation and training. *Proceedings of the 7th annual international conference on Systems documentation* (1989).
- [30] Nielsen, J. and Molich, R. *Heuristic evaluation of user interfaces*. 1990.
- [31] Pargman, R. Transit Cybersecurity: Tabletop Exercise. *Mass Transit*, 46, 7 (2020), 17-19.
- [32] Pattanayak, A., Best, D. M., Sanner, D. and Smith, J. Advancing cybersecurity education: pink elephant unicorn.

Proceedings of the Fifth Cybersecurity Symposium (2018), 1-7.

[33] Peiser, J. *We're in a golden age of board games. It might be here to stay.* 2022.[Online] Available: <https://www.washingtonpost.com/business/2022/12/24/board-game-popularity/>.

[34] Pilon, M. *The secret history of Monopoly: the capitalist board game's leftwing origins.* The Guardian, 2015.[Online] Available:

<https://www.theguardian.com/lifeandstyle/2015/apr/11/secret-history-monopoly-capitalist-game-leftwing-origins>.

[35] Polit, D. F. and Beck, C. T. International gender bias in nursing research, 2005–2006: A quantitative content analysis. *International journal of nursing studies*, 46, 8 (2009), 1102-1110.

[36] Prabawa, H. W., Junaeti, E. and Permana, Y. *Using capture the flag in classroom: Game-based implementation in network security learning.* 2017.

[37] Risberg, G., Johansson, E. E. and Hamberg, K. A theoretical model for analysing gender bias in medicine. *International journal for equity in health*, 8 (2009), 1-8.

[38] Sandusky, S. *Gamification in education* (2015).

[39] Shanklin, S. B. and Ehlen, C. R. Using the Monopoly board game as an efficient tool in introductory financial accounting instruction. *Journal of Business Case Studies (JBCS)*, 3, 3 (2007), 17-22.

[40] Simon, T., Pagel, S. and Korfflesch, H. F. O. v. Influencing factors for acceptance of digital tools in the humanities. *Proceedings of Mensch und Computer 2020* (2020), 17–27.

[41] Strååt, B., Rutz, F. and Johansson, M. Does Game Quality Reflect Heuristic Evaluation? Heuristic Evaluation of Games in Different Quality Strata. *Int. J. Gaming Comput. Mediat. Simul.*, 6, 4 (2014), 45–58.

[42] Swank, J. M. The use of games: A therapeutic tool with children and families. *International Journal of Play Therapy*, 17, 2 (Oct 2008 2008), 154-167.

[43] Tampubolon, C. *Shuffles Board Game Cafe a unique and playful space.* University Wire, 2019.

[44] Technavio *Board Games Market Value is Set to Grow by USD 3.02 Billion from 2021 to 2026, Increasing Digitization of Board Games to be the Premium Trend.* 2022.[Online] Available:

<https://www.prnewswire.com/news-releases/board-games-market-value-is-set-to-grow-by-usd-3-02-billion-from-2021-to-2026--increasing-digitization-of-board-games-to-be-the-premium-trend-301598692.html>.

[45] Thompson, E., Luxton-Reilly, A., Whalley, J. L., Hu, M. and Robbins, P. Bloom's taxonomy for CS assessment. *Proceedings of the tenth conference on Australasian computing education-Volume 78* (2008), 155-161.

[46] Weiss, R., O'Brien, C. W., Mountroudou, X. and Mache, J. The Passion, Beauty, and Joy of Teaching and Learning Cybersecurity. *Proceedings of the 2017 ACM SIGCSE Technical Symposium on Computer Science Education* (2017), 673-674.

[47] Westphal, B. J., Lee, H., Cheung, N.-M., Teo, C. G. and Leong, W. K. Experience of designing and deploying a tablet game for people with dementia. *Proceedings of the 29th Australian Conference on Computer-Human Interaction* (2017), 31-40.

[48] Woodgate, R. How to Check for Inclusive Language in Microsoft Word. *How-To Geek* (07/01 2020).