

TaskMaster: The Subintern Adventure Game—Game-Based Learning for Medical Subintern Task Prioritization

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Abstract

Introduction: The medical subinternship (also known as an acting internship) offers postclerkship medical students an opportunity for significant professional development. However, the skills required of a successful subintern—efficiency, patient triage, and advanced organization—are distinct from skills generally refined during the medicine clerkship. Few published curricula exist to prepare postclerkship students for success in this new role. To address this training gap, we introduced a novel tabletop role-playing game to equip medical subinterns with the necessary skills to deliver safe and efficient patient care. **Methods:** We created an hour-long game-based learning session for rising internal medicine and family medicine subinterns. Led by a single facilitator, students worked together to triage and complete tasks in a gamified simulated environment of a morning on the wards. To assess the session, we surveyed participants ($N = 130$) immediately after activity completion. **Results:** Eighty-three participants completed the postactivity survey, for a response rate of 64%. A majority of students agreed that TaskMaster: The Subintern Adventure Game met its educational goals of increasing comfort with task prioritization, organization, and patient triage. Ninety-three percent of respondents (77 of 83) either agreed or strongly agreed that they felt more prepared to be a covering provider for patients after the activity. Participants also reported high engagement with the activity. **Discussion:** Leveraging the interactivity, teamwork, and contextualized practice of game-based learning can offer low-cost and adaptable opportunities to teach higher-order clinical skills and increase preparedness for the subinternship.

Keywords

Board Games, Game-Based Learning, Gamification, Competency-Based Medical Education (Competencies, Milestones, EPAs), Games

Educational Objectives

By participating in this game-based workshop, learners will be able to:

1. Assume the simulated role of a medical intern caring for two patients.
2. Simulate prioritizing 10 patient care tasks for two complex clinical scenarios.
3. Simulate a high-priority patient handoff with the emergency department team for a newly admitted patient.
4. Simulate responding to up to 12 common calls from nursing or ancillary services on the wards.

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Introduction

The medical subinternship, or acting internship, is a crucial period for medical student development and preparation for residency.^{1,2} Although structures of the rotation vary widely across institutions, many medical subinternships offer students their first opportunity to assume full responsibility for patient care in the inpatient setting.^{3,4} However, this additional responsibility requires exercising new skills, including patient triage, task prioritization, and advanced organization, that are not generally emphasized during the medicine clerkship. Similarly, few formal curricula exist during or in preparation for the fourth year of medical school to develop these higher-order skills.^{5,6} Consistent with this curricular gap, fourth-year students, recent medical school graduates, and residency program directors have all identified a lack of training in this domain as an area of weakness for postclerkship medical students.⁷⁻¹¹ Lack of adequate preparation for the role of primary provider has been associated with student discomfort and may lead students to struggle with providing timely, effective, and safe patient care during their subinternships and beyond.⁷

Building on the success of a limited number of prior educational innovations targeting isolated skills for medical subinterns (e.g., time management or order entry), we created a novel intervention combining all these unfamiliar domains into a comprehensive simulation of a day in the life of an intern.^{12,13} In order to promote high levels of interactivity, we elected to gamify this simulation, noting the prior success of gamification in diverse medical education settings.¹⁴⁻¹⁷ Incorporating core elements of game-based learning (such as complex decision-making, distributed learning through a game community, and deep learning from contextualized role assumption), we developed a game entitled TaskMaster: The Subintern Adventure Game.^{18,19} In this collaborative, tabletop, role-playing, gamified simulation, we presented students with scenarios they would be likely to encounter during their inpatient medical subinternship, including managing cross-cover, practicing order entry, and attending to acutely ill patients, all while maintaining focus on efficiency and task prioritization, core skills required for postclerkship rotations.

By creating a believable and engaging introduction to the daily responsibilities of a medical intern on the wards, we aimed to bridge the gap between the medicine clerkship and the subinternship and to empower students to deliver excellent patient care during their rotations.

Methods

Development

Project authors with graduate-level training in medical education (AL and AO) and experience as course directors of the family medicine (JL) and internal medicine (AL and AO) subinternship rotations at a single urban academic institution performed a literature review and identified a need for additional training on efficiency and appropriate triage of patient care tasks to prepare postclerkship students for patient care.⁸⁻¹¹ Three authors (AL, JL, and AO) created an interactive, tabletop, role-playing, game-based simulation of a morning on the inpatient wards to allow rising internal medicine and family medicine subinterns to practice these skills in a low-stakes environment. Through frequent discussion and group consensus, we iteratively designed game content to challenge students with material slightly beyond their current level of training.

Educational Goals (Distinct From the Educational Objectives Listed Above)

By the end of this activity, learners were introduced to the following concepts:

- The importance of efficiently triaging clinical tasks during a simulated morning on the wards.

- Creating a patient-specific to-do list.
- Responding effectively to common nursing calls and messages.
- The importance of calling for sign-out on a newly admitted emergency department patient in a prompt manner.

Equipment/Environment

Game equipment (per session):

- Six-sided dice (four), one for each student team and one for the session facilitator.
- One device to keep time (e.g., cell phone).
- Facilitator guide/gameplay instructions (Appendix A).
- Character class card printouts (Appendix B; one for each student team).
- One TaskMaster game board per student (Appendix C).
- One TaskMaster scorecard for the facilitator (Appendix D).
- Facilitator version of the TaskMaster PowerPoint slide deck (Appendix E).
- Student version of the TaskMaster PowerPoint slide deck (Appendix F).

Technology:

- One classroom computer and projector to display the TaskMaster student version slides (Appendix F).
- One separate laptop for the preceptor to view the TaskMaster facilitator version slides (Appendix E).

Implementation

TaskMaster, an hour-long, tabletop, role-playing game, launched in the fall of 2022 during an institution-wide subinternship training day for all students nearing the end of their clerkship year ($N = 130$). We administered six separate game sessions, each facilitated by one of the project authors. Each game session hosted about 21 students divided into three teams of roughly equal size, per game instructions (Appendix A). We designed game sessions to host student groups ranging from three to 24 students preparing to start their medical subinternship. Session facilitators could be PGY 2 or PGY 3 residents or faculty members.

Prior to the session: Session facilitators independently reviewed the facilitator guide (Appendix A) to learn gameplay instructions. To fully understand game flow, project authors met separately to play a test run of the game with medical student volunteers. Total preparation time for facilitators was 90 minutes. Project authors purchased dice (for less than \$10; the only monetary expense for this session) and printed the character class cards (Appendix B) in advance of the activity. Administrators from the school of

medicine reserved a classroom with a computer and projector for each game session.

Day of the session: Prior to starting the game, session facilitators distributed one die and one character class card (Appendix B) to each of the three student teams as well as one game board replicating a “scut sheet” (Appendix C) to every participant. Facilitators procured a die of their own, the TaskMaster scorecard for keeping score (Appendix D), and a timer (cell phone). After distributing the game materials, facilitators loaded the facilitator version of the TaskMaster PowerPoint slides (Appendix E) onto a personal laptop to view the answer key, speaker notes, and criteria for successful task completion by student teams. Then, facilitators projected the student version of the TaskMaster PowerPoint slides (Appendix F) in slideshow mode and followed the instructions on the slides to start the game. After setting a timer for 50 minutes, facilitators progressed through the game according to the gameplay instructions found in the facilitator guide (Appendix A) and cues on the student version of the slide deck (Appendix F). Gameplay ended when all tasks from the TaskMaster main game slide had been completed by the student teams or when the timer hit 50 minutes.

Scoring: After gameplay ended, the facilitator completed a scorecard (Appendix D) based on number of tasks completed, total time required to complete the tasks, and total penalty time accrued by the group during the activity. Although there were

three student teams in each session, all the students in each session were working together to accomplish tasks in the least amount of time and with the fewest time penalties. If multiple game sessions were being run, student group scores could be compared across sessions to determine the most efficient overall student group.

Assessment

Immediately after completing the game, students were asked to scan a QR code and complete a voluntary, six-question survey with an estimated completion time of 2 minutes (Appendix G). We designed the survey to evaluate achievement of the four session goals in each of the first four questions, assess preparedness for the role of covering provider in the fifth question, and provide a space for open-ended feedback from participants in the final question. The University of Pennsylvania Institutional Review Board deemed this project exempt from IRB approval. We reviewed the data using basic statistical analysis.

Results

Eighty-three out of a possible 130 students completed the postactivity survey (response rate of 64%). Results of the survey are presented in the [Figure](#).

Specifically, 94% of survey respondents ($n = 78$) agreed or strongly agreed that the activity enhanced their ability to triage clinical tasks during a busy workday. Similarly, 93% of survey

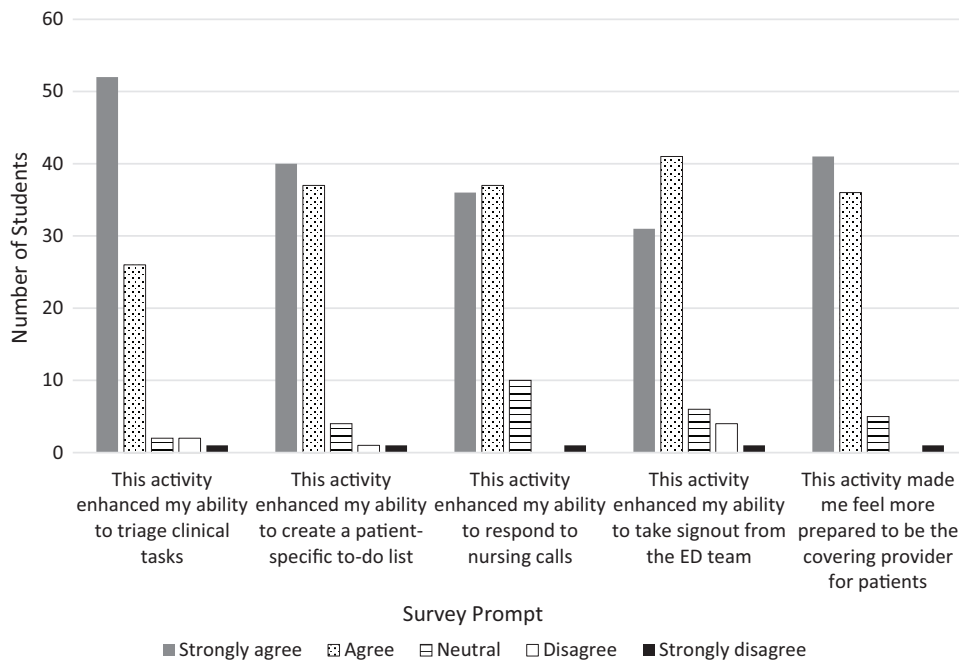


Figure. Graphic results of the TaskMaster game survey immediately following game completion. Abbreviation: ED, emergency department.

respondents ($n = 77$) agreed or strongly agreed that the activity enhanced their ability to create a patient-specific to-do list. Regarding the final two session objectives, 87% of survey respondents ($n = 72$) agreed or strongly agreed that the activity enhanced their ability to both respond to nursing calls and take sign-out from the emergency department team. The percentage of survey respondents who agreed or strongly agreed that the activity made them feel more prepared to be the covering provider for patients was 93% ($n = 77$).

Representative responses to the open-ended question soliciting additional feedback included multiple independent comments noting the activity was “really engaging,” “useful,” and “fun.” Students specifically appreciated the chance to practice new skills with real-time assessment and feedback: “I really like the practice of triaging tasks and practicing calling consults in a way that felt real with immediate feedback!” Finally, several students indicated an overall positive experience with the game and its relationship to the medical school curriculum: “Amazing activity. Strongly recommend for future classes,” and “Amazing, wish more med school teaching was like this.”

Discussion

Our results show that TaskMaster participation among late clerkship-year students was associated with increased self-assessed preparedness for triaging clinical tasks, creating an organized patient to-do list, responding to nursing calls, and taking sign-out from the emergency department team. These results suggest that a workshop specifically targeting higher-level clinical skills can increase student confidence within this domain. Additionally, the increased confidence in utilizing this skill set, combined with the well-described transfer of skills from game-based simulation to real-world practice, may lead to more effective patient care from students new to practice.¹⁸ Review of the survey responses also affirms our experience during the sessions that the game fostered high levels of student engagement. Furthermore, the level of positive feedback from participants suggests that this resource may offer valuable insights for future game-based initiatives within medical education.

We believe there were several factors leading to the high levels of student engagement. Specifically, the incorporation of dice rolls introduced elements of luck and chance that increased the game’s verisimilitude and led participants to eagerly anticipate outcomes that were not predetermined. Engagement was further increased by raising the stakes both through purposeful selection of content material intended to

challenge these postclerkship students and by allowing for failure with penalties such as increased time or additional tasks meant to mimic real-life consequences. Finally, the game was designed to be collaborative within each group but competitive across all groups playing. The competitive spirit fostered teamwork and added an element of fun as each group raced to the finish line to complete all the required tasks in the least amount of time.

Another potential benefit of TaskMaster is its adaptability. Because the game is cost-effective—the only financial cost being less than \$10 to purchase dice—it is easy to imagine reproducing the session with other learners at similar stages at different institutions. Clinical content may need to be adapted based on local institutional needs and curricular goals. Ultimately, the skills promoted by TaskMaster revolve around communication, teamwork, efficiency, and prioritization, which are broadly applicable to a vast audience.

As we received minimal constructive feedback from students on the initial version of TaskMaster, we did not make any major changes for subsequent iterations. Future survey iterations will ask students to commit to a take-home point from the session to use when delivering patient care during their subinternship. Future evaluation methods could also include a focus group led by a neutral third party. The session continues to be implemented in its original form at our institution for rising subinterns prior to the start of their subinternship.

Although our educational innovation reached a reasonable sample size, it remains limited in that it occurred at a single institution where medical subinterns were expected to assume full responsibility for the care of their patients (with appropriate resident and attending supervision). Additionally, although there is no prerequisite work for students to complete, the prep time required for session facilitators to learn TaskMaster likely poses a limitation. Finally, our results encourage the idea that gamification can be an effective instructional method, but we are missing higher-level outcomes and long-term data that would demonstrate true efficacy in preparing students for the subinternship or for intern year. However, the relatively low barrier to entry and the promising initial results may offer a foundation on which to build future efforts to optimize student preparedness for residency.

TaskMaster has been incorporated into an annual subinternship training day for clerkship students at our institution. Positive reception of the game has led to a call for more gamified and simulation activities for students.

A tabletop role-playing gamified simulation activity intended to engage and challenge postclerkship learners provides a high-impact educational opportunity at low cost. Thoughtful curricular development around gamification offers promise for the future of medical education.

Appendices

- A. Game Instructions.docx
- B. Character Class Cards.docx
- C. Game Board.docx
- D. Scorecard.docx
- E. Facilitator Slide Deck.pptx
- F. Student Slide Deck.pptx
- G. Postworkshop Survey.docx

All appendices are peer reviewed as integral parts of the Original Publication.

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Disclosures

None to report.

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Ethical Approval

The University of Pennsylvania Institutional Review Board deemed further review of this project not necessary.

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