Clinical Coaching Cards: A Game of Active Learning Theory and Teaching Techniques

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Abstract

Introduction: Clinical Coaching Cards is a serious game for faculty development in which players take turns as Teacher and Coach to apply teaching techniques on game cards to identify new approaches to teaching in the clinical environment. The game employs active learning theory and coaching frameworks. **Methods:** Based on a literature search and local faculty practices, we identified 14 techniques for clinical teaching and created a deck of cards summarizing each. We adapted rules from social judgment games so that participants proposed and selected techniques for applicability to their own teaching. The game was presented as a subsession of larger faculty development workshops hosted by the University of Washington, and players included faculty, residents, and medical students. Evaluations focused on the applicability of techniques to participants' clinical practice and preferred new techniques. **Results:** Seventy-four players provided evaluations out of over 150 participants across six workshops. Participants rated the session as mostly or very organized in 70 of 74 evaluations (95%), the introductory material as mostly or very relevant in 67 evaluations (91%), and the teaching techniques as most or several being useful in 69 evaluations (93%). Although some techniques were more popular than others, every technique was selected as a Top 3 technique for future practice. **Discussion:** Clinical Coaching Cards is a card game that applies active learning within a framework of peer coaching to teach bedside and clinical teaching techniques.

Keywords

Serious Games, Tabletop Games, Active Learning, Clinical Teaching, Bedside Teaching, Curriculum Development, Faculty Development, Mentoring/Coaching, Clinical/Procedural Skills Training, Games

Educational Objectives

By the end of this activity, learners will be able to:

1. Appraise a variety of bedside teaching techniques to support learning in the clinical environment.
2. Evaluate the use of specific techniques to improve specific educational challenges from their teaching experience.
3. Select techniques applicable to their own teaching practice for future use.

Introduction

Serious games are structured tools designed to apply educational theories and to use game objectives to achieve educational ends.[1] The nature of play allows participants to interact and enact relationships in an abstracted and safe

manner; play is exploratory and relatively boundary free. When players adopt shared rules, objectives, and incentives, play becomes a game. Game players can optimize their actions to better achieve these objectives cooperatively or competitively. Game activities can feature feedback mechanisms, including reactions from other players, to reinforce specific skills and through which achieving game objectives positively reinforces learning.[2,3] An effective educational game integrates game mechanics (the rules of the game) and immersive dynamics (how players interact in the game) into the learning environment.[4] Clinical Coaching Cards is designed to teach bedside teaching techniques using active learning theory within a framework of peer coaching. The techniques have been selected as examples that apply active learning theory and can be used in turn in a coaching interaction in the clinical environment.

Active learning describes a variety of interrelated theories in which learners actively participate in their own learning, including setting goals and objectives. Active learning techniques engage learners to identify gaps in their own knowledge, ask questions, and share experiences to bolster their own and others'

knowledge, thus providing opportunities for educational sessions to be both interactive and tailored to individual learners' needs.[5-8]

Coaching in health professions education is characterized by individualized real-time feedback, mutually set goals, and development of new behaviors, insights, or approaches; it is given by an expert in the field to a person in training.[9] This framework is readily compatible with active learning theory and provides a model for bedside and clinical teaching.

Reciprocal peer coaching, which our game employs, is distinguished from the broader construct of coaching by flattening the hierarchical relationship between participants. Peer coaching describes interactions in which experienced teachers take turns in the role of teacher coach and coached teacher to engage in identification of individual challenges, collaborate in problem-solving, and "[enhance] their teaching repertoires within an atmosphere of collegial trust and candor."[10-13]

Clinical Coaching Cards is a game of collaborative problem-solving and peer-to-peer teaching in which participants learn to apply clinical teaching techniques. Bedside and clinical teaching is highly valued by patients, trainees, and clinicians,[14-16] and many bedside teaching techniques employ active learning theory.[17,18] Gameplay recreates the reciprocal peer coaching framework and uses active learning, through group discussion and low-stakes competition, to reinforce content consisting of bedside teaching techniques selected from published literature and techniques used at the University of Washington. These techniques, in turn, become available for participants in their own clinical teaching and can be used in a framework for coaching, though they are not limited to this use. Our target audience is primarily faculty who teach in clinical settings, although medical student and resident participants have provided useful perspectives and insightful contributions as well. We draw upon active learning theory and game mechanics to allow participants to translate their own real-life experiences and challenges into solutions applicable to their own clinical teaching practice. By playing the game, participants gain valuable perspectives from their colleagues as well as access to the game's tool kit of teaching techniques, themselves selected as methods for active learning in the clinical environment, to draw upon for future clinical teaching scenarios.

Many educational games rely upon shared knowledge and competition to increase engagement and highlight specific content and borrow from existing games, such as the many adaptations of Jeopardy![19] or other quiz-based games using game boards, to provide an alternate structure.[20] Others recreate

aspects of clinical care, such as managing shock[21] or flow in an emergency department,[22] in an abstracted form that focuses on different components of the activity than would be presented in simulation. Game designers must remove unneeded elements from actual practice while retaining real relationships that emphasize specific actions for their educational value; they must also balance the time spent learning a complex game and the time available to engage in the activity.[2,23] Clinical Coaching Cards has been designed to recreate the peer coaching framework within the rules of existing popular tabletop games, similar to the educational game Madness to Methods.[24] This design adds to the existing body of serious games by demonstrating how intentional alignment of the game activity and the educational objectives can allow a simple set of instructions to generate immersive play.

Methods

Content Development

We searched *MedEdPORTAL* and online databases including Google Scholar, ERIC, PubMed, and PsycInfo for teaching techniques and methods that could be applied to teaching in the clinical setting, using keywords including *active, clinical*, *bedside*, *teaching*, *coaching*, and *reasoning*, as well as reviewing citations for additional techniques. We also drew upon techniques from faculty development workshops for clinical teaching hosted at the University of Washington. Ultimately, we identified 14 clinical teaching techniques for oral case presentations, physical examination, clinical reasoning, skills training, and feedback; several of our techniques were preexisting, while others were synthesized from health professions education literature and faculty development workshops.[17,25-31]

We designed a deck of cards in which each card showed a single technique with a unique title, visual icon, and background color. We encapsulated techniques into general descriptions and step-by-step instructions for applying each technique, the principle or theory informing the technique, and a citation of the publication source for published techniques. We also included a wild card to allow players to suggest a technique they had personally used that was not covered by the existing cards or to imagine a new technique that could be helpful in the described teaching scenario.

Game Development

We adapted game mechanics popularized by existing social judgment card games such as Apples to Apples (Mattel) and Cards Against Humanity (Cards Against Humanity LLC). These games follow a common sequence: A judging player poses a

question or proposal; the other players each provide an answer or suggestion card; the judging player chooses their favorite from amongst the suggestions. Such games also utilize the mechanics of hand management and action selection, meaning that players select certain cards (in our game, teaching techniques) based on the available choices present in their hands.[32] For each round in Clinical Coaching Cards, one player was the Teacher who described a specific clinical teaching scenario, ideally a real-life clinical teaching encounter they found personally challenging. Other players were Coaches who each offered a technique card from their hand to cue discussion—and friendly debate—to convince the Teacher that their proposed technique was most suitable for the described teaching scenario. From among the multiple proposed techniques, the Teacher chose their favorite: the technique that was the most useful and applicable for their teaching situation. Participants were encouraged to solicit ideas to improve their own teaching, draw from their real-life experiences with clinical teaching techniques, imagine and even role-play the application of novel techniques, and offer constructive feedback and solutions.

During each workshop, we took extensive notes on gameplay, specifically noting players' understanding of the rules, engagement with the game, and interactions with each other, including the richness of discussion and debate. We requested feedback about the clarity of game rules and the use of the techniques themselves. After each workshop, we revised the rules, the supplemental materials, and the introductory presentation for clarity and brevity. There have been several iterations of the game and presentation to date.

Implementation

The workshop began with a 10-minute presentation describing active learning theory, principles of serious games, and an overview of the rules and gameplay. The presentation (Appendix A: CCC Presentation.pptx) was projected in a large-group didactic, and the technique handout (Appendix B: CCC Handout.docx) was distributed and summarized by one of the presenters. Presenters demonstrated a sample round of the game, followed by a question-and-answer session to clarify the content presented on the cards and handout.

Game structure was flexible for play within different group sizes and time constraints. Gameplay ran from 30 to 90 minutes, with shorter sessions consisting of three to four players using a single deck of cards per group and longer sessions consisting of six to eight players using two or three decks of cards per group. We printed and brought one deck of cards (Appendix C: CCC

Print-and-Play Cards.pdf) per three to four participants, variously using card stock cut to 4 × 5.5 inches and later professional printing and lamination services to produce commercial-grade cards measuring 3.5 × 5 inches, both versions larger than standard 2.5 × 3.5-inch playing cards (Appendix D: CCC Card Design.pdf). Included in the deck was a larger card that described rules, gameplay variations, and different conditions for when to end the game, that is, after a certain number of rounds were played (Appendix E: CCC Rules Card.pdf).

To play the game, we encouraged players to begin with an icebreaker introductory round in which they introduced themselves and described their clinical teaching settings. Players then shuffled the technique cards and dealt each participant a hand of three to four cards. The first player assumed the Teacher role and described a teaching scenario that they had found challenging in their environment. The other players assumed Coach roles, and each offered a technique from their hand as an appropriate method to teach in that scenario. The Teacher considered these proposals, selected the technique and proposal they thought would be most useful, and placed the selected card into a pile called the Toolkit. The remaining cards were shuffled and redealt, and play proceeded with the next player in the Teacher role. Play typically continued until every participant had played the Teacher role at least once.

During gameplay, the workshop leaders floated between groups to help answer questions, clarify rules, facilitate discussion, and take notes to inform future revisions.

We concluded the workshop with debriefing, including participant reflections on techniques, teaching challenges, and feedback on game content and gameplay. At the end of the discussion, evaluations were distributed and collected.

Evaluation

We developed an evaluation tool to assess the effectiveness of the activity (Appendix F: CCC Evaluation.docx). We first asked participants to rate the organization of the presentation. We then asked them to rate the relevance of the introductory discussion and teaching techniques to their own teaching roles using anchors from the New World Kirkpatrick model[33] on a scale of *Not, Somewhat, Mostly,* and *Very.* We evaluated the relevance of individual techniques by asking participants to rank their top three techniques for incorporation into their upcoming clinical teaching (Kirkpatrick level 2, commitment). We included free-text response fields asking participants to suggest additional teaching techniques for inclusion in the game, as well as improvements to gameplay and the session as a whole.

We transcribed responses to Google Sheets (Google LLC) and calculated descriptive statistics for ratings of organization, relevance, and usefulness. We tabulated the frequency of selection of each technique in participants' Top 3. Free-text responses were reviewed for content and used to inform revisions to the game and presentation.

Results

Workshop leaders (Bjorn Watsjold and Diana Zhong) developed and presented the game as part of their respective education-focused fellowships hosted by the departments of emergency medicine and internal medicine at the University of Washington. Our institution included teaching faculty spread across a five-state region, and workshops were hosted for regional and departmental faculty. The initial workshop was presented at a regional faculty meeting including surgical and nonsurgical faculty who trained at a community affiliate hospital, with 14 participants. We revised the game and workshop for presentation to a larger regional group in Chico Springs, Montana, including a variety of surgical and nonsurgical specialties, core academic faculty and affiliated community physicians who taught rotating clerkship students, a few nonclinical teaching faculty interested in active learning, residents, medical students, and support staff. We were subsequently invited to present the workshop at local department end-of-year and quarterly academic faculty meetings for internal medicine and family medicine, to a junior-faculty development course, and at a second regional faculty meeting in Boise, Idaho.

We collected 74 evaluations over six workshops, with groups ranging from 14 to more than 40 participants, approximately 150 participants overall. Seventy-one of the 74 evaluations were complete, two evaluations included two of the three ratings, and one evaluation included no ratings but did identify techniques for future use.

Participants rated the session as very organized in 43 of the 74 evaluations (58%) and as mostly or very organized in 70 evaluations (95%). The introductory material was rated as very relevant in 52 evaluations (70%) and mostly or very relevant in 67 evaluations (91%). Teaching techniques were rated as "Most items were useful" in 51 evaluations (69%) and as "Most items were useful" or "Several items were useful" in 69 evaluations (93%). One participant rated the exercise not relevant and not useful but in free text noted, "Not a clinical teacher/preceptor, don't work with students so not as relevant." See the Table for a summary of ratings.

Table. Participant Evaluations ($N = 74$)

Question	No. (%)			
	1	2	3	4
Organization of the session[a]	0 (0)	2 (3)	27 (36)	40 (58)
Relevance of introductory material[b]	1 (1)	4 (5)	14 (20)	50 (70)
Usefulness of techniques[c]	1 (1)	1 (1)	17 (24)	49 (69)

[a]Rated on a 4-point scale where 1 = *poorly organized*, 2 = *somewhat organized*, 3 = *mostly organized*, and 4 = *very organized*.
[b]Rated on a 4-point scale where 1 = *not relevant*, 2 = *somewhat relevant*, 3 = *mostly relevant*, and 4 = *very relevant*.
[c]Rated on a 4-point scale where 1 = *not useful*, 2 = *few items were useful*, 3 = *several items were useful*, and 4 = *most items were useful*.

Frequency statistics indicate that each of the techniques was chosen by a participant among their Top 3, although some techniques were much more popular. The Figure shows the frequency of selection of the techniques.

In feedback from free-text responses and notes taken by workshop leaders, three themes were used to refine the workshop: how to get the groups started in discussion, revisions to the rules that diverged from the initial structure, and the usefulness of prepared scenarios for gameplay.

Our notes highlighted the usefulness of the icebreaker to initiate discussion so that participants had a sense of each other's teaching environments. We saw that having a champion educator in each group was helpful to keep the group on task and to generate ideas if discussion slowed. These champions were typically event organizers or faculty known to the presenters with a vested interest in the larger educational session in which our workshop was presented.

We also observed variations develop in individual groups—some players gravitated within a workshop towards collaborative play, in which the goal was to describe within the group a useful means to apply each technique; some enjoyed more creative generation of techniques, in which senior faculty chose to use wild cards in each hand to present additional techniques not included in the deck. Revisions to gameplay included changes to discard and reshuffling and the addition of collaborative versus competitive goals.

A frequent tension in groups included requests for "Set scenarios," "Please provide a standardized scenario," and "Organize scenario cards like clue, other examples: running behind in clinic or rounds or other extenuating circumstances." Between the third and fourth sessions, we adapted gameplay to provide structured basic scenarios, that is, a range of possible learners, settings, and clinical topics. After this implementation, feedback indicated that these structures were too constraining; for example, "Scenarios didn't apply well to us, we preferred
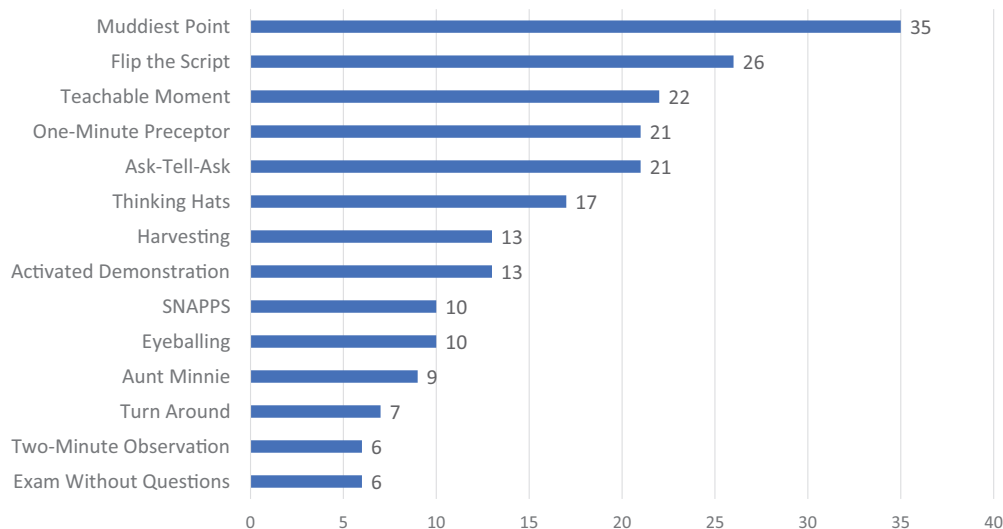
Figure. Number of times each technique was selected in participants' Top 3 (*N* = 74).

to make our own," and "Less structured scenarios (too limiting)."

Informal feedback included positive responses to the design of the cards and requests for copies of the game for participants to take to their home institutions or to provide to deans and department chairs for distribution amongst faculty. Prototype copies of the game have been given to participants at each workshop as we made revisions between presentations.

Discussion

We developed Clinical Coaching Cards as a layered presentation of active learning theory, such that the method of teaching (peer coaching) reflected the content of the workshop (techniques for bedside and clinical teaching). We found game mechanics were readily adapted to apply active learning theory and accomplish educational objectives within the structure of a game. Similar applications could apply theories of communities of practice, zone of proximal development, and transformative learning theory.[5,34,35]

Gameplay structured the faculty development session and focused topics of discussion, and the mechanics of social judgment, when combined with peer coaching, allowed faculty to consider the application and relative merits of the techniques presented on game cards. Our educational objectives (to propose and appraise these techniques) were enacted within the game and represent objectives within Bloom's taxonomy[36] of a higher level than would be readily achievable in a didactic session.

The outcome of the sessions (selection of techniques for future practice) demonstrated an array of preferences. All 14 techniques were selected among participants' Top 3, though some proved far more popular than others. Per debriefing sessions, the most popular tended to be easily applied in a variety of settings and also to be deployable in the briefest interactions. Contrary to this, a single champion could persuade a group that a technique was valuable, and evaluations would reflect additional uptake. The most-selected technique (Muddiest Point) was chosen on 11 of 13 evaluations in one session and only three of 11 in another, while the least-selected techniques (Exam Without Questions, Two-Minute Observation, and Turn Around) each had three of their six or seven total selections in a single session. Faculty reflected that some of these techniques were difficult to apply: Exam Without Questions and Turn Around were both better suited to preclinical settings in which faculty were on wards with students for teaching sessions, and Turn Around required finesse to avoid negative stereotyping of patients during the interaction. Some faculty asked for an evidence-based ranking of techniques as a heuristic to simplify the presentation, but we would suggest that the utility of a technique depends more on alignment of the educational need and the context in which it is applied.

Strengths of the workshop included the application of shared faculty knowledge and expertise to self-identified teaching challenges. We witnessed far greater breadth of discussion than we as educators could package into a prepared session, including perspectives from different degrees of experience and varying teaching and learning environments, brought out through the game structure.

We frequently observed a pattern where groups became more comfortable and vocal after one or two turns had been played, after which point engagement rapidly improved. This may have been due to both familiarization with the gameplay format and increased comfort in a social setting with new people. The game used an introductory icebreaker round where players described their clinical teaching settings to help initiate discussion before gameplay began. The inclusion of a highly motivated player—such as a faculty member interested in education—helped accelerate engagement and discussion. As session leaders, we facilitated mostly as observers, occasionally clarifying misunderstandings and answering questions. We encouraged variations in play to accommodate different groups, allowing that cooperative, competitive, or more free-form discussion of the techniques served some participants better than others.

Limitations of the workshop include lower Kirkpatrick-level evaluations of satisfaction with the activity. Two of our objectives were achieved inherently in the game activity but not directly measured. Future evaluations could include direct requests for why techniques were or were not among participants' selections and would provide qualitative data on how participants evaluated the usefulness of specific techniques. Such data might also support assessment of the level of analysis, as well as whether techniques have been chosen based upon applicability to teaching context, ease of use, or other reasoning. The Top 3 selection measure was intended to demonstrate commitment to use as a precursor to behavioral change, but lack of long-term follow-up limits our knowledge of whether there has been any uptake of new techniques or change in teaching behavior, including the use of coaching or active learning theory. Although most of the techniques have been published in the health professions education literature, outcome-level data have not been published for most techniques.

Future iterations of the game will encompass more clinical teaching techniques and further match the needs of varied clinical settings and subspecialties. Many participants have requested copies of the game, some asking to host their faculty development workshops with the cards and others to keep as an on-hand (pocket) resource for enriching their teaching techniques in their real-world practice.

Appendices

A. CCC Presentation.pptx

B. CCC Handout.docx

C. CCC Print-and-Play Cards.pdf

D. CCC Card Design.pdf

E. CCC Rules Card.pdf

F. CCC Evaluation.docx

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

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