Teaching rigor, reproducibility, and transparency using gamification

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OBJECTIVES/SPECIFIC AIMS: The objectives for the Rigor, Reproducibility, and Transparency course within KAIZEN-Edu was to provide a platform that allows essential training, in a novel and customizable approach, for a large number of students across the multiple institutions within the UAB CCTS Partner Network. Successful implementation across this geographically diverse of partner institutions would serve as proof of concept to future dissemination across the CTSA consortium.

METHODS/STUDY POPULATION: We used the “build a game” tools within Kaizen-Edu to design the “Rigor and Reproducibility Game.” The games consisted of four modules, with 20 questions designed to test participant knowledge, and eddy learners on particular concepts through a multimedia approach (embedded video, text, and hyperlinks to articles) with content provided as questions released over 4 weeks. Researchers from across the UAB CCTS Partner Network developed comprehensive modules for (1) How Scientists Fooled Themselves/Scientific Premise, (2) Authentication of Chemical and Biologic Resources and Sex and Other Biologic Variables, (3) Statistical Rigor, and (4) Comprehensive Review. A typical week began with review articles (1–2) sent to each participant. The participants are informed that 5 questions will be released midweek testing the key concepts from the papers. When ready, the participant logs into Kaizen-Edu and starts to answer questions/play the game. Immediately, the articles are opened for reference, followed by a brief 4–5 minute video which reinforces key concepts and then timed questions begin. A typical question is allowed 3 minutes (visible countdown clock). Accurate responses result in the addition of points, with double points awarded for correct answers within the questions time limit. No points are awarded for incorrect answers. After each question, a detailed explanation reviews and reinforces the key concepts. Each participants’ points contribute to both their individual score and team scores, which influence their position on the Rigor and Reproducibility game leaderboard.

RESULTS/ANTICIPATED RESULTS: Within 2017, the Rigor Reproducibility, and Transparency course was conducted 5 times. A total of 126 researchers across 9 institutions were enrolled. A total of 87 enrollees completed the full course, with 80% passing (answering ≥75% of questions correctly) on their first attempt and an additional 20% passing on a second attempt. The distribution of completers across the CCTS Network was UAB = 48, Auburn = 13, Pennington = 10, University of Alabama = 5, Hudson Alpha = 5, Tulane = 4, University of South Alabama = 1, LSU = 2, and Southern Research = 1. Researchers throughout at Partner Institutions represent 46% of the total population trained. DISCUSSION/SIGNIFICANCE OF IMPACT: This software based, gamification-enhanced course was broadly accepted with each session fully enrolled, and learners spread almost evenly between our institution and various Partner Network sites. Our pilot proves that gamification was an effective technique to engage users and produced a high pass rate, suggesting that the content both engaged learners and was effectively internalized. Educational interventions, imbued with principles of gamification provide educators powerful tools that use competition and/or collaboration to disseminate knowledge, engage learners with content, and save educator time as compared to some current traditional sessions. The leveling of clinical research competencies arrayed (1) of the registration process (4.5/5), the class environment (4.5/5), and the instructor (4.6/5). Data from these evaluations are positive to date and is used to continually refine the program.

ANTICIPATED RESULTS: Since 2007, CEED has graduated 45 Scholars. Seventy-six percent have been women, 78% have been non-White, and 33% have been Hispanic/Latino. Scholars include 20 M.Ds. and 25 Ph.Ds. Twenty-eight CEED Scholars were matched to non-CEED URB students. Compared with matched URB students, CEED graduates had a higher mean number of peer-reviewed publications (9.25 vs. 5.89; p < 0.0001) were more likely to hold an assistant professor position (54% vs. 14%; p = 0.004) and be in the tenure stream (32% vs. 7%; p = 0.04), respectively. There were no differences in Career Development Awards (p = 0.42) or Research Project Grants (p = 0.24). DISCUSSION/SIGNIFICANCE OF IMPACT: Programs that support URB researchers can help expand and diversify the biomedical research workforce. CEED has been successful despite the challenges of a small demographic pool. Further efforts are needed to assist URB researchers to obtain grant awards.

The clinical research operations program: Educating clinical research staff

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OBJECTIVES/SPECIFIC AIMS: The Clinical Research Operations Program is a free educational program designed to educate clinical research personnel on the conduct of clinical research (CR). The participant completes 16 required core sessions (24h), 4 elective sessions (4h), and passes the final exam to receive a certification in CR operations at Stanford. Sessions focus on the 9 domains of CR established by the Joint Task Force for Clinical Trial Competency, such as Ethical & Participant Safety Considerations, Clinical Study Operations, & Data Management/Informatics.

METHODS/STUDY POPULATION: Sessions are taught by volunteer lecturers. Participants may also attend the sessions without pursuing the certification. The program objective is to provide easy-access education in CR in order to increase regulatory compliance, staff retention, and improve CR at Stanford. The program targets CR coordinators, however, staff, postdocs, fellows, and faculty also participate.

RESULTS/ANTICIPATED RESULTS: Since the program’s launch in January 2017, 119 individuals have enrolled in the certification program. The most represented group is the Department of Medicine. Sessions consistently reach their maximum with a waiting list. Each core session requires that the participant complete an evaluation (Likert scale, 1–5) of the registration process (4.5/5), the class environment (4.5/5), and the instructor (4.6/5). Data from these evaluations are positive to date and is used to continually refine the program.

The leveling of clinical research competencies

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OBJECTIVES/SPECIFIC AIMS: Objectives/goals: Describe the process used to develop leveled competencies and associated examples. Discuss the final leveled competencies and their potential use in clinical research professional workforce initiatives. METHODS/STUDY POPULATION: The revised JTFCTC Framework 2.0 has 51 competency statements, representing 8 domains. Each competency statement has now been refined to delineate fundamental, skilled or advanced levels of knowledge and capability. Typically, the fundamental level describes the competency for a professional that requires some coaching and oversight, but is able to understand and identify basic concepts. The skilled level of the competency reflects the professional’s solid understanding of the competency and use of the information to take action independently in most situations. The advanced level embodies high level thinking, problem solving, and the ability to guide others in the competency. The process for developing both the three levels and examples involved 5 workgroups, each chaired by a content expert and comprising of national/international clinical research experts, including representatives from research sites, professional associations, government, and industry and academic sponsors.

RESULTS/ANTICIPATED RESULTS: The committee developed 51 specific competencies arrayed across 3 levels and examples of each to demonstrate an appropriate application of the competency. The competencies and examples, and potential utilization, will be described. DISCUSSION/SIGNIFICANCE OF IMPACT: The use of competencies in the context of workforce development and training initiatives is helping to create standards for the clinical research profession. These leveled competencies allow for an important refinement to the standards that can be used to enhance the quality and safety of the clinical research enterprise and guide workforce development.

The need for an evidence-based CTS specific IDP for early career training and for a long-term and sustainable career in clinical translational sciences

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OBJECTIVES/SPECIFIC AIMS: To establish a conceptual framework to develop a CTS-IDP with data analytics, and an e-Learning Faculty Development Guide on...
best practices and use of the IDP over the CTS academic life-course. METHODS/STUDY POPULATION: To accomplish our goal, we propose the following methods: (1) to conduct a convenience sample of the 24 K22 CTSA Collaborative members (conducted in 2017), to assess perceived needs for a universal CTS-IDP, current IDP practices, barriers to IDP use, and to discern and align each CTSAs Hub’s interests, expertise and commitment to specific areas of the study; (2) A scoping literature review, utilizing the Arksey and O’Malley framework covering the time period corresponding to the initiation of funding (1999) of the original K30 Clinical Research Curriculum Awards through to the present; (3) delineate IDPs within the CTSA funding period, incorporating Medical Subject Heading (MeSH) keywords of the original K30 Clinical Research Curriculum Awards through to the present framework covering the time period corresponding to the initiation of funding (1999) and receive a completion certificate. All (100%) were satisfied with the TC, and 96% of the respondents, their expectations were fulfilled, and will continue in future. DISCUSSION/SIGNIFICANCE OF IMPACT: The TC demonstrated to be an effective strategy to provide new knowledge, experiences, and interest in CTR. It also established a pathway for future engagement in CTR.

Training cycle in clinical and translational research (CTR) for undergraduate health sciences programs (HSUP) at University of Puerto Rico-Medical Sciences Campus (UPR-MS) and Universidad Central del Caribe (UCC): Pathway for students and faculty

OBJECTIVES/SPECIFIC AIMS: Responding to the need and interest of students and faculty of the UHPH in learning about CTR, the Title V Cooperative Project between UPR-MS and UCC, developed and offered a training cycle (TC) in CTR. METHODS/STUDY POPULATION: Undergraduate students (US), undergraduate faculty (UF), and graduate students (GS) were invited to register in Research Education Towards Opportunities (RETO) and Mentorship Offering Training Opportunities for Research (MOTOR), which consisted of 20 hours of training in CTR, with interdisciplinary sessions in: Introduction and preparation of a presentation in CTR; Identify, interview and share a presentation of a CT researcher; participation in conferences and a summer camp in CTR. At the end of the TC, surveys—satisfaction and needs assessment—for training in CTR were administered. RESULTS/ANTICIPATED RESULTS: Thirty-three (33) registered in the TC, distributed: 13 (39.3%) US in RETO, 12 (36.3%) GS and 8 (24.2%) UF in MOTOR. Of these, 25 (75.7%) answered and submitted the on-line surveys and received a completion certificate. All (100%) were satisfied with the TC, and for 96% of the respondents, their expectations were fulfilled, and will continue in the TC. They selected critical review, scientific communication, and cultural diversity as thematic areas of interest. In addition, 60% of them selected neuroscience, cancer and medical imaging as main research areas of interest. DISCUSSION/SIGNIFICANCE OF IMPACT: The TC demonstrated to be an effective strategy to provide new knowledge, experiences, and interest in CTR. It also established a pathway for future engagement in CTR.

Using a reviewer database to facilitate integration of an investigator-focused translational research and career development program across the state of Indiana

OBJECTIVES/SPECIFIC AIMS: The Indiana CTSI is investigating innovative approaches to integrate resources that will enrich scientific investigators. Our