Assessment of 21st Century Skills During an Innovation Challenge

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Students develop soft skills through frequent feedback and reflection, but skill development is difficult to measure. Innovation skills are desired for many career directions. Innovation challenges, like the one described here, give students the opportunity to address real-world problems while working in teams. We developed a toolkit to assess student growth in important skills needed to become effective presenters, innovators, and leaders. Participants practiced giving and receiving feedback about contributions and team dynamics. Following the program, students reported increased confidence in communication and presentation skills. Students reflected upon the importance of feedback and reported improved teamwork following guided reflection sessions.

Keywords: innovation, critical thinking, collaboration, communication, creativity, feedback

INTRODUCTION

Higher education offers a wealth of knowledge, cultural experiences, and networking opportunities, but surveys from the Higher Education Research Institute show that students' primary motive for attending (and choosing) a university is to find a better job (Stolzenberg et al., 2019). Technical skills pertinent to their chosen field are necessary, but "soft skills" are also required to be employable (Schulz, 2008). To help students become competitive in the job market, universities are tasked with helping students master material and skill sets that make them effective communicators, innovators, and leaders. With a similar goal of preparing students for 21st century success, the National Education Association (NEA) introduced

collaboration, communication, creativity, and critical thinking as "the 4C's" to be prioritized by primary and secondary educators (NEA, 2017).

Students majoring in STEM (science, technology, engineering, and mathematics) disciplines learn technical problem-solving and analysis during their degree programs, but systematic training in leadership, teamwork, and entrepreneurship rarely occurs (Council of Canadian Academies, 2015). In the university classroom, collaboration is often "taught" by the use of group projects (Beier et al., 2018) while communication is "taught" by requiring oral presentations (Braun, 2017; Parker et al., 2020). Programs designed to prepare students for health care fields may use interdisciplinary or interprofessional teamwork to expose students to real-life collaboration challenges (Havyer et al., 2014; Morphet et al., 2014). As has been observed in pedagogy directed toward teaching critical thinking, explicit feedback and systematic assessment greatly enhance the impact of an educational experience (Hattie & Timperley, 2007).

Innovation challenges have been included in numerous business and entrepreneurship programs (Harkema & Schout, 2008; Wei et al., 2019). Bringing real-world innovation challenges to the STEM fields may help increase relevance of coursework and help improve communication skills across disciplines (Pellegrini & Jansen, 2013). For example, the Mayo Innovation Scholars Program gives biomedical students opportunities to work with inventors and intellectual property experts to apply design thinking to solve clinical problems (Pellegrini & Jansen, 2013). Discussed here, the Presidential Summer Clinical Innovation Fellowship Program at the University of Alabama at Birmingham offers similar opportunities for students to innovate in a real-life clinical setting (Berry et al., 2019). The design thinking process helps students to become more confident in their creativity and is a promising method for innovation in the healthcare setting (Altman et al., 2018). Using the design thinking process, students also learn to develop empathy with situations beyond their previous experience, which can also transfer to interactions with future stakeholders. These creativity and innovation skills are some of the most sought-after qualities in a new-hire.

Throughout the educational process, giving feedback is emphasized, yet in many cases it is not applied in an effective manner for learning (Poulos & Mahony, 2008; Bailey & Garner, 2010). Nicol et al. (2014) discussed the learning mechanisms behind peer review and concluded that students strongly benefit from both giving and receiving feedback. However, this process can be time-consuming. While written peer review mechanisms are often in place for group work, limiting feedback to written only may become a missed opportunity for conversation and discussion within teams. Reynolds and Russell (2008) found that audio feedback may be more impactful, as higher-order concerns are more often addressed. Feedback schedules can be developed to facilitate ongoing and meaningful discussion.

In this study, we assessed the impact of a real-life innovation challenge on undergraduate students, comparing STEM students with students pursing a Bachelor of Science (BSN) in Nursing. The experience included structured peer feedback and discussion of team dynamics, followed by individual reflections. We developed survey instruments for assessing student inclination for innovation and confidence in themselves as creators, communicators, critical thinkers, and collaborators. Guided reflection, individual feedback, and structured interviews augmented the assessment. We hypothesized that in the context of structured teamwork and feedback, all students would show increased confidence in themselves as collaborators, critical thinkers, communicators, and innovators and that there might be differences between BSN and STEM students on these measures. In addition, we hypothesized that a focused intervention to examine team dynamics at the mid-point of the experience would improve collaboration and communication. We further hypothesized that gains in these important innovation skill areas would be maintained at a follow-up assessment.

This paper describes a toolkit for assessing students' development of innovation, communication, teamwork, and critical thinking skills.

MATERIALS AND METHODS

Participants

Participants were selected for a Presidential Summer Clinical Innovation Fellowship Program in which they were tasked with developing solutions for challenges in the University of Alabama at Birmingham (UAB) Hospital system. Five students were selected from "STEM disciplines" (i.e., students majoring in either Biomedical Engineering or Neuroscience) and five students were selected from the BSN program. STEM students applied and were selected based on expressed interest in committing their summer to working on an innovation challenge. BSN students were selected based on a video application they made to the School of Nursing BSN Honors Program. All students provided informed consent to participate in the assessment, and our protocol was reviewed by UAB's Institutional Review Board (IRB-060619003).

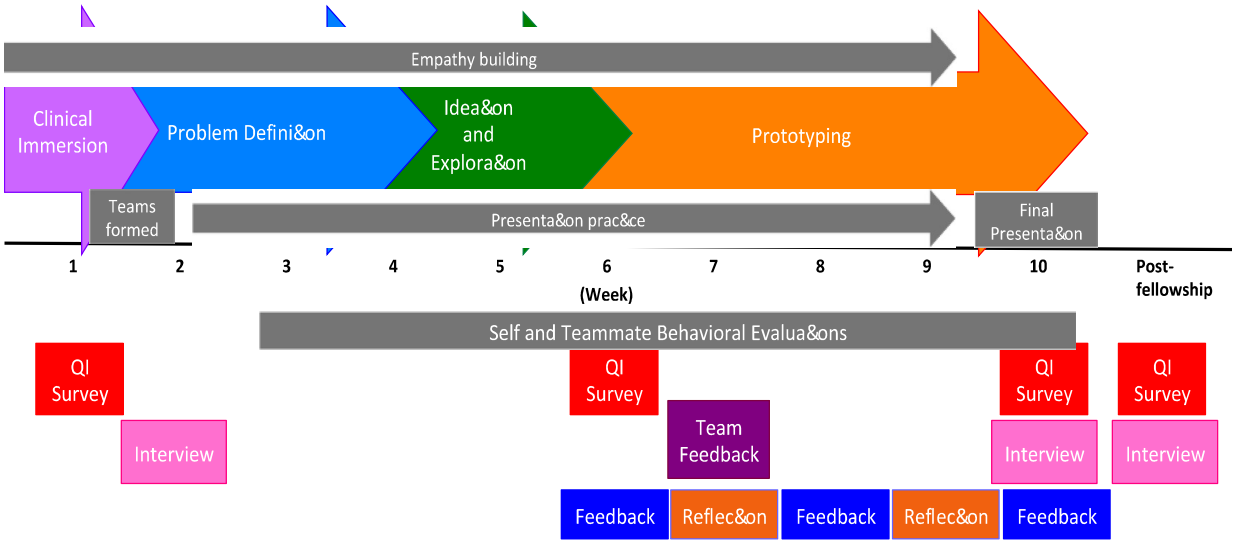
Clinical Innovation Program Structure

Program structure required BSN students to participate in the fellowship program for a minimum of 6 hours per week in addition to their other nursing courses, whereas STEM students were required to participate in the fellowship program for at least 30 hours per week as the major part of their summer studies. Participants were split into two interdisciplinary teams to work on different projects related to hospital-acquired sepsis using the UAB Solution Studios® software platform (Berry et al., 2019): four students worked toward a virtual reality (VR) training tool for nurses, while six students worked toward a wearable device (WD) to continuously detect vital signs. Each project group was composed of an equal number of STEM and BSN students.

This program enlisted numerous facilitators to assist the fellows throughout the summer. A number of faculty and staff members worked to advise students on their projects and to connect the students with additional resources on campus. These faculty members included such disparate disciplines as nursing, electrical engineering, computer engineering, and biostatistics. A student liaison who had participated in the program the previous year served to organize important meetings and large group activities each week. A program evaluator organized assessments and interventions, compiled feedback for each individual, and conducted semi-structured interviews. The interviewer reminded students that the outcomes would help inform data-driven decisions for future iterations of this fellowship program.

Prior to the start of the fellowship, students were required to read *Creative Confidence* by Tom and David Kelley (2013). This book introduced students to the design thinking process and reinforced the importance of the summer activities, which included a week of clinical immersions, time for problem definition, ideation and exploration, and prototyping (Figure 1). Each week, students documented their progress in a formal presentation to the entire group. These presentations also served as practice for the final, high-stakes presentation that was given to University leadership and community leaders.

FIGURE 1
TIMELINE OF THE FELLOWSHIP ACTIVITIES AND ASSOCIATED ASSESSMENTS



At week 6, all students received summarized feedback from the self- and teammate-behavioral evaluations previously collected. Each student was asked to reflect upon the feedback received and write action steps to address it. At week 7, each project group met with the program evaluator to discuss individual student feedback, team dynamics, and a plan of action for team cohesiveness moving forward.

Assessment Instruments

Weekly, students assessed their own behaviors as well as those of two of their teammates: one teammate from their discipline (STEM or BSN) and one from outside of their discipline. The questions in the behavioral assessments were strategically formed to address areas of hypothesized change, including communication, creative process, critical thinking, and commitment to the project. Example questions for each of these areas are available in Table 1, and a formatted assessment is available in Appendix A.

TABLE 1
BEHAVIORAL ASSESSMENT QUESTIONS

Theme	Questions
Communication	I contribute substantively to the team discussion
	I share ideas with people in positions of power
	I adjust my communication to audience or context
Critical Thinking	I trouble shoot effectively
	I consider future roadblocks and potential "wins"
	I am stalled by challenges[2]
	I organize ideas and information well
Collaboration	I interrupt my teammates[2]
	I encourage my teammates
	I am respectful of others' ideas
	I summarize/paraphrase the comments of others
Commitment	I work hours beyond what is required
	I bring excitement to the team and project
	I stretch beyond my comfort zone
Creativity	I consider problems from various angles
	I focus on the big picture
	I change approaches when stalled

[1]These questions were modified with the introduction of "My teammate" for peer-assessments.
[2]Reverse-scored

In weeks 1, 6, and 10, and 3 months after the fellowship, participants took the "Qualities of an Innovator Survey" (QIS) (Table 2, Appendix B), which we developed to assess students' confidence in their problem solving and creativity, their abilities to communicate and present ideas, and their confidence in skill sets that improve teamwork. The survey also assesses a student's willingness to take intellectual risks and tolerate ambiguity (Table 2). Some questions in behavioral assessments and the QIS were reverse-scored (Tables 1, 2). Questions were scored on a Likert scale; behavioral assessments used 0-4 where 0= Never, 1= Rarely, 2= Sometimes, 3= Often, and 4= Always. The QIS used a scale of 1-5, where levels of importance and confidence were 1= Not at all, 2= A little, 3= Somewhat, 4= Fairly (important/confident), and 5= Highly (important/confident). For each subcategory of each assessment, points were totaled and expressed as a percentage of potential points. Structured interview and reflection questions are indicated in Tables 3-6.

TABLE 2
QUALITIES OF AN INNOVATOR SURVEY

Theme	Questions
Innovation Orientation	How important is it to you to have a clear role?
	How important is to you to be sure that your efforts will produce results?
	How important is it to you to avoid conflict with others about your ideas or strategies?
	How important is it to you to get individual credit for your ideas?
	How important is it to you to potentially make a discovery or solve a problem?
	How important is it to you to successfully complete a task?
	How important is it to you to choose your own problems?
	How important is it to you to avoid failure?[1]
	How confident are you that you can tolerate setbacks without giving up?
Communication	How confident are you that you can present ideas to persons in power?
	How confident are you that you can behave professionally in a high stakes situation?
	How confident are you that you can develop a compelling presentation?
Creativity	How confident are you that you can develop creative solutions?
	How confident are you that you can ask questions that lead to examining things in new ways?
	How confident are you that you can connect ideas from different contexts?
	How confident are you that you can move forward when the path to solution is not clear?
Critical Thinking	How confident are you that you can offer useful ideas for solving problems outside of your discipline?
	How confident are you that you can offer useful ideas for solving problems in your discipline?
	How confident are you that you can develop an effective strategy for approaching a problem?
	How confident are you that you can identify problems that need solving?
Collaboration	How confident are you that you can effectively redirect a discussion?
	How confident are you that you can really listen to the ideas of others?
	How confident are you that you can contribute innovative ideas to a team?
	How confident are you that you can work effectively as part of a team?

[1]Reverse-scored

Semi-structured interviews were conducted in week 2 (Table 3), at the conclusion of the fellowship (Table 4), and several months after the fellowship (Table 5). The timeline of these events is available in Figure 1. In weeks 7 and 9 students were asked to reflect upon the feedback they received and to formulate written individualized action items to plan for improving areas of weakness as identified by the behavioral assessments or to build upon their identified strengths. The questions asked are available in Table 6. These reflection questions were assigned through Canvas, UAB's learning management system, allowing for individuals to focus their thoughts on their own time and documenting their responses.

TABLE 3
STRUCTURED INTERVIEW QUESTIONS, WEEK 2

Theme	Question	Common Threads
Goals	What do you anticipate will be your next career steps?	BSN students expressed interest in pursuing additional degrees in nursing (CRNA, NP, PhD). STEM students expressed interest in medical school and PhD programs. Some students felt they were too early in their education to know what they wanted to do next.
	What do you hope to get out of this experience?	Students commonly said the experiences of working in interdisciplinary teams, building creativity and innovation, and networking as important aspects of this fellowship
	How does this experience fit in to your career?	Students believed that implementing research, design thinking, and innovation would be critical in future career moves.
Risk-taking	Have you ever started a task and realized it might not be possible? What did you do?	Yes; change approaches, brainstorm with others
	Have you ever decided you are not good at something? How did you reach that conclusion?	Yes; by trying things a few times, it didn't come easily. 5/10 students mentioned that if it was important they would work hard to become good at it
Brainstorming	How do you approach working on a problem?	Students commonly cited doing some background research and brainstorming (getting other perspectives, making lists, and getting other perspectives) before making a structured plan.
	What kinds of tools have helped you in the brainstorming process in the past?	Most students liked to brainstorm by writing ("word dumping," writing everything out, making lists, and sticky notes). Talking to other people also helped.
Teamwork	What do you anticipate you will bring to the team dynamic?	Students emphasized that their team would not have a leader but that they would hold themselves accountable and help the team stay organized. STEM students: being good at the heavy science (neuroscience) and prototyping (engineering). BSN students: clinical experiences, medical knowledge, and empathy for patients as strengths.

	What roles do you normally take on in a team?	Half of the students said they tended to lead or organize a team. One identified themselves as a communicator, and four as supporters or willing to get the rest of the work done.
	Do you generally enjoy teamwork? Why or why not?	There were mixed feelings about teamwork. If teams were collaborative and had set standards, students had good experiences. Some concerns included differing personality types and differing levels of commitment.
	What do you think is valuable about working in teams?	Different perspectives and the ability to bounce ideas off of others were benefits of working in teams. Three students mentioned building interpersonal relationships and learning to work with others as additional benefits.
Overall	What are you most nervous about for this experience?	All BSN students cited managing time and balancing classes, clinicals, and the fellowship as their biggest worry. STEM students were most worried about the final product and/or the final presentation.
	What are you most excited about for this experience?	7/10 students were most excited about the final products. Two were most excited to be in the hospital and see new things. Two also mentioned network connections and working in interdisciplinary teams.

TABLE 4
STRUCTURED INTERVIEW QUESTIONS, WEEK 10

Theme	Question	Common Threads
Overall	What was the most important take-away from this experience?	7/10 students discussed the benefits and challenges of working in interdisciplinary teams and the impact of communication in that collaboration. Other topics included the work that they did, the design thinking process, and improved confidence in oneself.
	How do you anticipate this summer program will influence your future?	Students cited many different ways the program will influence their futures, including a newfound passion, a better understanding of the perceptions of others, building their networks, and new career paths (doctorates, desire to work in innovation, be a leader, etc.)
Brainstorming	What tools or strategies were most useful during the brainstorming process?	The WD team brainstormed ideas and sorted through them after surveying what was currently available. They often cited the input from others as very helpful. The VR team all discussed a brainstorming exercise they completed using sticky notes.
	Do you feel that your group was able to capture the essence of the	All students were confident that they had.

	sepsis problem while also considering all options?	
Risk-taking and Confronting Problems	How confident were you in contributing unique ideas or perspectives?	All students felt fairly confident. A few started out less confident but through the process became more comfortable voicing their opinions.
	Can you identify a "light bulb moment" during your time working on this project? What happened and how did you get to that moment?	Four of six members of the WD team said their "lightbulb moment" was where the device would be located during the brainstorming process. Each of the four members of the VR team cited a different moment. Three of these related to the game but one was related to dynamics between the teams.
	Did you use any strategies in your problem-solving that you did not originally anticipate? What were they?	STEM students on the WD team talked about the help they received from faculty and professionals in the field. Members of the VR team discussed using people's strengths appropriately and becoming better communicators in and out of the team.
Teamwork	What were the biggest challenges in working with your team?	Three challenges came up consistently: the difference in time spent on the project between STEM and BSN students, communication issues, and personality conflicts.
	What were the biggest challenges in working with the other team?	The biggest challenges identified between teams included lack of respect for individuals on other teams, communication, and that the teams weren't always in the same stage of the design thinking process.
	What were the benefits of working with students in another discipline?	STEM students cited the BSN students' background knowledge and clinical expertise. BSN students cited the STEM students' technical knowledge. Students also noted that working in an interdisciplinary team gave them new perspectives and they learned how to communicate with people who thought differently.
	What were the challenges of working with students in another discipline?	Students generally discussed the time commitment differences for the STEM and BSN students in the program. Of note, STEM students on the WD team also felt the BSN students did not have a role after the initial brainstorming. BSN students on the WD team felt that STEM students did not try to keep them involved.

	What were the best successes?	Both teams cited their final products and the final presentation as big successes. Several students on the VR team also talked about days when the demonstrated the VR system and seeing how well-received the VR system and training could be.
	Did you feel valued within your team?	All STEM students enthusiastically felt valued. The BSN students on the VR team also felt very valued. BSN students on the WD team felt that, at times, they were seen as "just" nursing students and not as equals within their team.
Feedback	Were the feedback sessions valuable?	Sometimes it felt very "nitpicky" in regard to the presentation. While students felt feedback took a lot of time, they were happy it was being done. Overall, all forms of feedback were helpful. Three of four VR team members specifically mentioned the team reflection meeting as very helpful.
	What insights did these feedback sessions give you about your role and contribution in your team?	Students saw that everyone had different roles on the team. The feedback helped students identify their place on the team. Some of the feedback helped them to work on weaknesses that they were already aware of. Students also discussed that it was nice to see that others recognized their contributions.
	Was it challenging to receive feedback from your teammates?	Half of the students said that it was not difficult to receive the feedback and that it was very needed. The other half of the students said that it was a little bit challenging at first but that it got easier.
	Was it challenging to receive feedback from the other team?	Students claimed it was more tense to get feedback from the other team, and students didn't always trust the feedback from members of the other team. The students who didn't find feedback from the other team challenging to receive tended to find the feedback "nitpicky" and "irrelevant."
	How has your reaction to receiving critical feedback changed over the summer?	Students discussed that they liked getting feedback and that it was really valuable. It was easier to receive by the end. Receiving feedback throughout the process made it matter more and helped them to implement the feedback.
Overall	What was the most challenging part of this experience?	The majority (9/10) of students mentioned issues with time, communication, and balancing commitments. One student also

		discussed the challenge of being outside of their comfort zone.
	What was the most exciting part of this experience?	Most of the students (8/10) said that the final presentation and seeing both the device and the game come to life were the most exciting. One student mentioned the experience of working with such a passionate team, and another talked about the potential that these projects had to really make a difference for sepsis outcomes.
	What do you anticipate will be your next career steps?	Many of the students, although starting with a relatively strong plan for their next career steps, now feel unsure of their next career steps because the program opened their eyes to new opportunities. Some students will continue working on their projects, and many want to follow a career path that allows them to bridge the gap between the research and the people it affects.
	How did this experience fit into your career path?	Many of the STEM students referenced hospital immersion as useful for their future careers. One BSN student said that this experience may lead to a change in career path to something more research focused, as opposed to a career at the bedside. Overall themes included becoming more well-rounded individuals and learning to work in interdisciplinary teams.

TABLE 5
STRUCTURED INTERVIEW QUESTIONS, POST-EXPERIENCE

Theme	Question	Common Threads
Team Dynamics	Do you feel like your team had a clear leader?	No, but STEM students generally took a bigger role
	What role(s) did each member of your team serve?	Roles were not clearly defined, but they were based on strengths
	How did your team handle the task of splitting up Intellectual Property?	VR team: Talked about it as a group and split it up based on both summer work and future work WD team: Drama, lots of emotions about the process. Still in progress.
	What was the best part about working with your team?	All STEM students loved working in their teams. BSN students on the VR team also loved working on their team. All of the students appreciated the different

		perspectives from their interdisciplinary teammates.
	What were the biggest challenges in working with your team?	Universally, students cited personality differences, schedule differences, and communication issues as the biggest challenges within their teams.
	If you had the same teammates, but were tasked with the other project, what do you think your summer experience would have been like? (If needed, prompt students to discuss team dynamics)	All students felt team dynamics would have been about the same. BSN students perhaps had an easier time with VR project. Students were not as excited about the alternate project.
Feedback	How has the feedback that you received influenced you outside of the fellowship? Has it changed the way that you approach group work?	Students realized the importance of communication and having the courage to express their opinions. They claimed that the feedback inspired them to try to be more confident and more aware of how they come across to others. They also focused on listening to others more in group work.
Overall	If you were given the opportunity to participate in a similar program, would you take it? Why or why not?	Yes. Students saw this experience as transformative in that they matured and grew as a result. They also had fun while learning. Some claimed that projects are more productive when interdisciplinary.
	Would you recommend the Clinical Innovations Presidential Fellowship to a friend?	Yes- Students noted that they gained experience in research and were able to "dive into" the healthcare field.
	What was the most important takeaway from your summer experience?	The overall consensus was that communication is important. Students learned to work with people who think differently than they do.

TABLE 6
FEEDBACK REFLECTION QUESTIONS

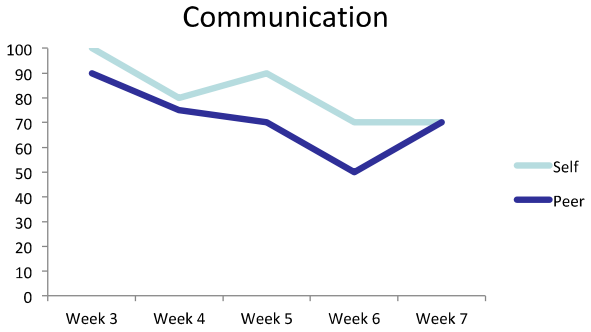
Week	Questions	Common Themes
7	What are you working to improve?	Students wanted to improve their communication and collaboration skills.
	What are your action items regarding your goals for improvement? For each action item, please elaborate by answering: A) What is this action item meant to address? B) What challenges have you experienced/might you anticipate with this?	This varied for students, depending on their goals.

	C) What will you do moving forward to make progress?	
9	What are you working to improve or "take to the next level"? (multiple answers are okay and encouraged!)	Students most commonly cited communication and collaboration topics as ways to improve. One student highlighted their need to be more committed to the project.
	What are the steps you have taken to work on this? What challenges are you facing? What successes are you having?	Strategies varied but those who interrupted tried pausing to let others speak, those who didn't always contribute voiced their opinions more, and STEM students worked on communication with BSN students by sending more emails. Students could tell that their teammates took notice of their changes.
	A) Has the feedback been helpful to you? B) Will it be helpful as you move forward in your career? Please elaborate.	All students said that the feedback has been helpful for future teamwork situations and understanding how they are perceived in a group setting.

Assessment Plan and Analysis

Summaries of student self- and teammate-assessments were given to each student at scheduled time points (weeks 6, 8, and 10). These feedback summaries included both graphs and words to help students see trends and recognize similarities and differences between their self- and teammates' perceptions (Figure 2, Appendix C). In week 7, the program evaluator intervened during group meetings to assist students in developing their individual action plans with input from their teammates. This intervention also addressed team dynamics observed by the evaluator. Teamwork challenges and strategies for improvement were discussed. In week 9, students were again asked to reflect on the feedback they received and to assess the impact that receiving feedback was having in developing their teamwork skill set.

FIGURE 2
EXAMPLE OF A FEEDBACK FORM THAT STUDENTS RECEIVED AT WEEKS 6, 8, AND 10



This student regularly self-rates as having better communication skills than is perceived by his/her teammates. Teammates regularly report that this student contributes substantively to the team discussion but that he/she doesn't often present their ideas to people in positions of power. This student and his/her teammates agree that the student does a consistently good job of adjusting communication to the audience or context.

Behavioral assessment data was grouped by time point (weeks 3-4, 5-7, and 8-10) to represent the different time frames of the project (problem definition and early teamwork, exploration and ideation, and prototyping, respectively). The overall confidence of students was assessed using the QIS. Scores on each dimension were compared between BSN and STEM students and between students assigned to the VR and WD project groups using independent samples t-tests. The impact of the innovation experience on QIS dimensions was assessed using a repeated measures analysis, comparing week 10 scores with week 1 scores. The impact of the intervention was assessed by comparing week 6 scores with week 10 scores.

Analysis of behavioral assessments was conducted similarly, using an average of weeks 3-4 as baseline, an average of weeks 5-7 as a midpoint, and an average of weeks 8-10 as the end point. Self-evaluations and evaluations by teammates were analyzed separately and the patterns compared. All analyses were conducted using SPSS and plotted using Prism 8.0.

Long-Term Impact

The long-term impact of the fellowship was assessed by comparing week 26 scores with week 10 scores on behavioral self- and team-assessments using repeated measures analysis. In the final structured interview, students were asked additional questions about their team dynamics and about the feedback that they gave and received during the summer. Students were also asked about their satisfaction with the program and whether or not they would recommend it to a friend. These interview questions can be found in Table 5.

RESULTS

Baseline Observations

At baseline, the QIS survey indicated that both STEM and BSN students who were selected for the summer innovation program were fairly confident in their ability to communicate effectively (85% vs 83%, STEM vs. BSN), think critically (76% vs 80%), and be creative (76% vs 80%) and innovative (85% vs 80%). They were highly confident in their ability to collaborate effectively (89% vs 87%). There were no significant differences on QIS dimensions between STEM and BSN students or between students assigned to the two project groups.

During the initial phase of the program (weeks 3-4), students' self evaluations of their contributions did not differ between STEM and BSN students. However, evaluations by teammates revealed that STEM students were perceived as more committed to their project than their BSN counterparts ($t(8)=6.45$, $p<.001$) and as having stronger critical thinking skills ($t(8)= 2.39$, $p<.05$). Initial phase behavioral assessments did not differ between students assigned to the two project groups, either as self-reported or as reported by teammates.

Impact of Program Participation

According to the QIS (Table 2), students who participated in this summer program reported improved confidence in communicating and presenting ideas between the start of the program and the end of the program (Figure 3A; $F(1,8)=15.61$, $p<.005$). Of the 10 students, 9 reported an increase in confidence about communication skills and the remaining student had reported full confidence in this skill at the start of the program and maintained this confidence throughout. Confidence in creativity also increased between week 1 and week 10 (Figure 3C; $F(1,8)=6.79$, $p<0.5$). These effects did not differ between STEM and BSN students or between project groups. Data points represent reported means with standard error bars.

Student's self-evaluations of their team-related behavior showed disparate trends across the innovation experience. Students reported improvement in communication skills between the beginning of the innovation experience and the end (Figure 4A; $F(1,8)=5.85$, $p<.05$). Students in the VR project group reported their commitment increased from the initial to final phase of the project (70% vs 84%) while for the WD project group self-reported commitment decreased (69% vs 60%); the interaction between project phase and project group was significant (Figure 6C; $F(1,8)=8.71$, $p<.02$). This pattern was corroborated by teammate evaluations (Figure 6D; $F(1,8)=7.12$, $p<.03$). Teammate evaluations indicated a reduced level of collaboration prior to the interventions (week 6) compared to week 1 (Figure 4D; $F(1,8)=9.41$, $p<.02$), with no differential change in collaboration between BSN and STEM subgroups or project groups. Teammate evaluations indicated that STEM students were perceived as showing more effective communication, higher commitment, and higher critical thinking skills than BSN team members. (Figures 4B,E, and 5B; ($F(1,8)=7.90$, $p<.03$, $F(1,8)=16.1$, $p<.005$, and $F(1,8)=33.26$, $p<.001$, respectively). In figures 4, 5, and 6, all data points are reported means for the respective groups with standard error bars.

FIGURE 3
QIS DATA SHOWS STUDENTS REPORTED GROWTH IN CONFIDENCE IN COMMUNICATION AND PRESENTATION SKILLS, CRITICAL THINKING SKILLS, CREATIVITY, AND COLLABORATION SKILLS BUT REMAINED STEADY IN THEIR ORIENTATION TO INNOVATION

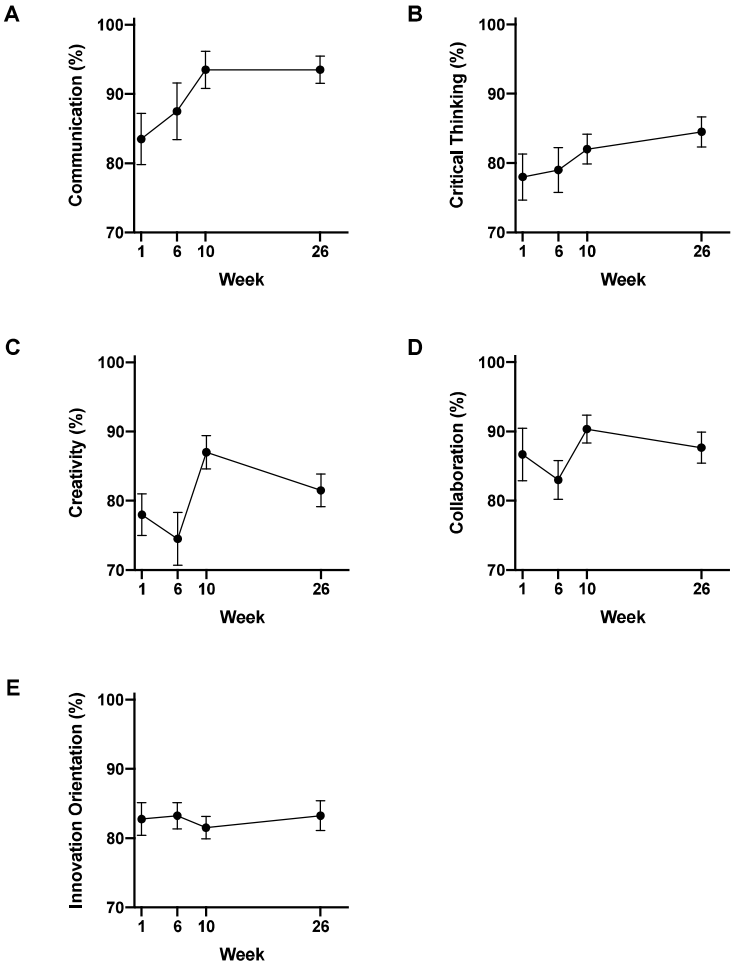


FIGURE 4
SELF- AND PEER- EVALUATIONS FOLLOW SIMILAR PATTERNS REGARDING COMMUNICATION SKILLS, COLLABORATION SKILLS, AND COMMITMENT TO THE PROJECT

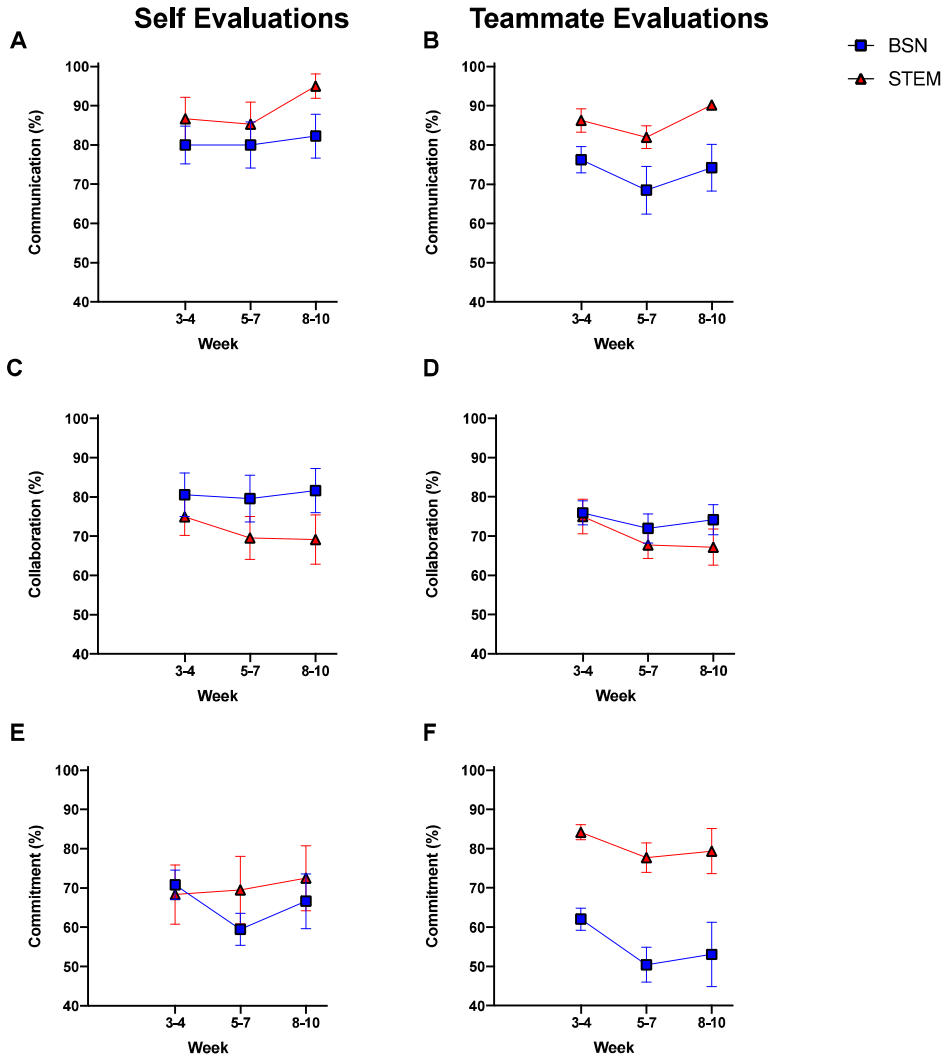


FIGURE 5
SELF- AND PEER- EVALUATIONS FOLLOWED SIMILAR PATTERNS FOR CRITICAL THINKING SKILLS AND CREATIVITY

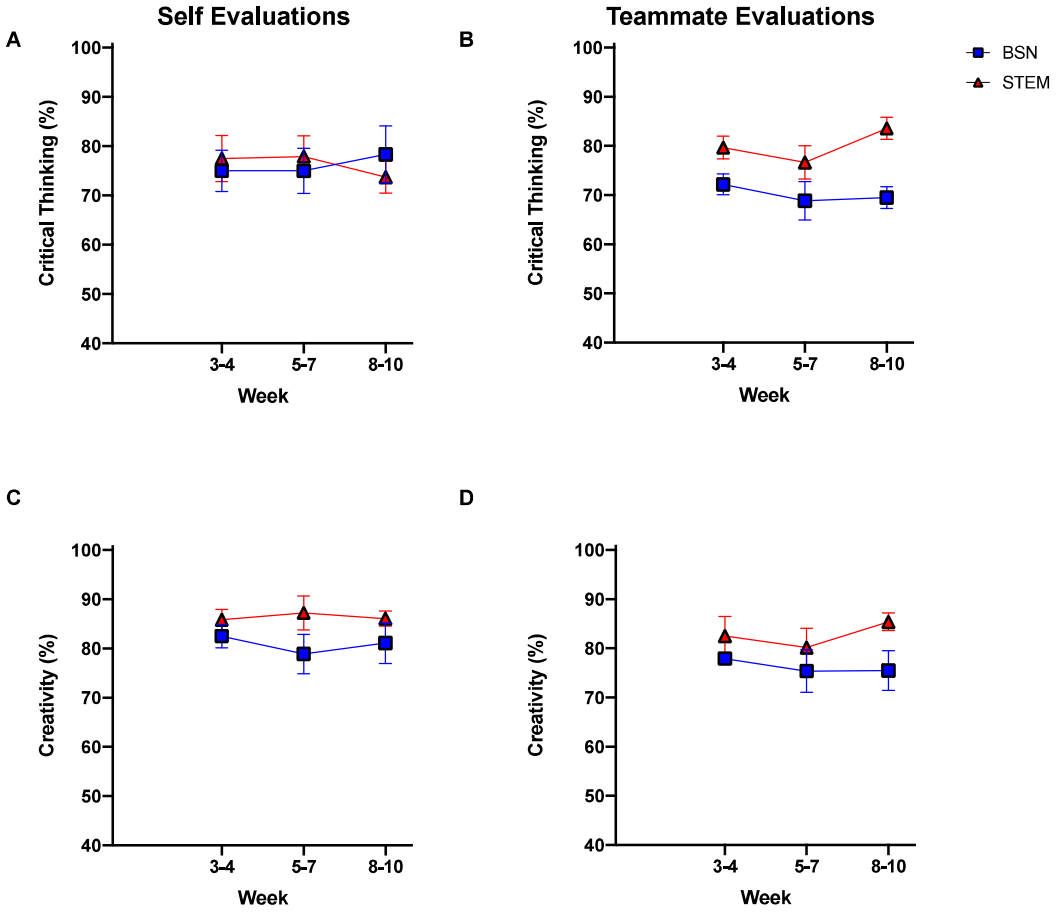
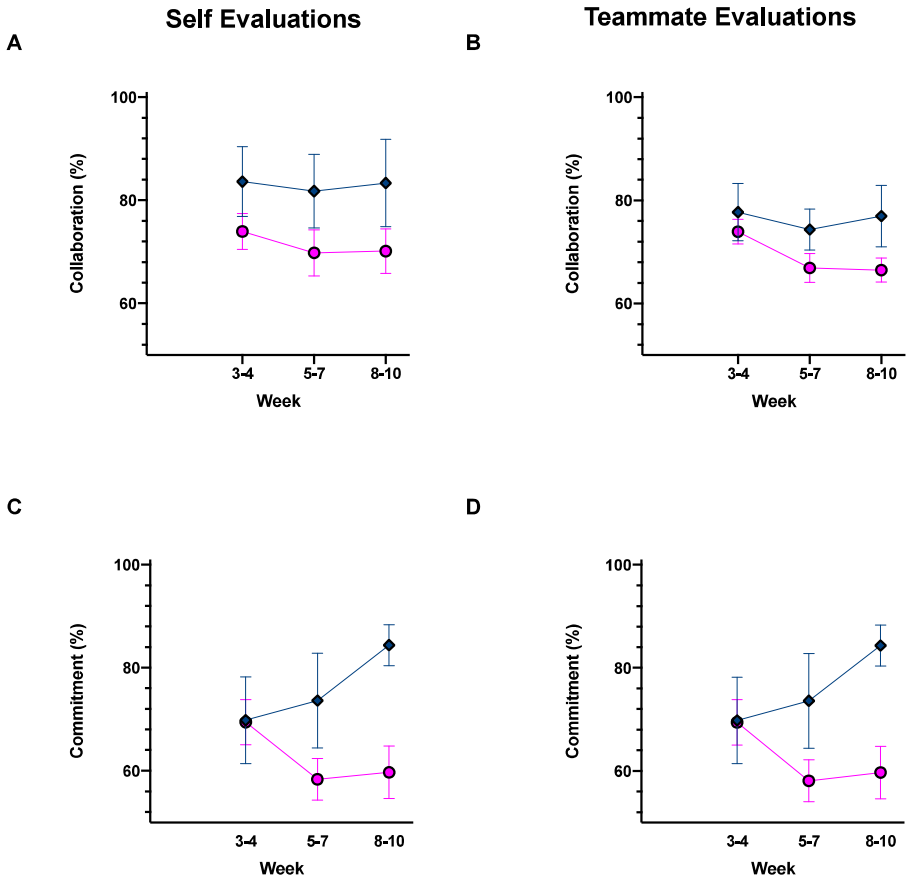


FIGURE 6
SELF- AND TEAMMATE BEHAVIORAL EVALUATIONS SUGGEST THAT THE VR PROJECT GROUP COLLABORATED MORE EFFECTIVELY AND THAT THEY WERE MORE COMMITTED TO THEIR PROJECT



Impact of Targeted-Team Intervention (Weeks 6-10)

The impact of a scheduled intervention involving a team discussion was examined using both the QIS and behavioral self- and teammate evaluations. The QIS indicated that confidence in creativity and in collaborative skills increased after the intervention at week 6 (Figures 3C,D; $F(1,8)=7.76$, $p<.02$ and $F(1,8)=7.54$, $p<.03$). These patterns were supported by the semi-structured interviews where two students directly reported this intervention as a turning point for improving team dynamics and cohesiveness.

The intervention increased both self-reported and teammate endorsed communication within the project groups (Figures 4A,B; $F(1,8)=5.99$, $p<.05$ and $F(1,8)=6.06$, $p<.04$, respectively). Teammate evaluations did not differ between project groups but did indicate that the STEM students, who had a five-fold greater time commitment to the project per week, were perceived as communicating more effectively, being more committed to the project, and having stronger critical thinking skills both before and after the intervention, (Figures 4B,F and 5B; $F(1,8)=6.48$, $p<.04$, $F(1,8)=12.17$, $p<.01$, and $F(1,8)=9.28$, $p<.02$, respectively).

Sustained Impact of Program

No significant change was observed on any dimension of the QIS between the conclusion of the innovation experience and three-month follow-up (Figure 3). When the 3-month follow-up data were

compared with the baseline measures, the increased confidence in communication skills was confirmed (Figure 3A; $F(1,8)=7.38$, $p<.03$).

Semi-Structured Interviews

In post-fellowship interviews, students were asked about leadership within their teams. Members of the VR project group were adamant that the entire team worked together and served in different roles based on their strengths. Although the VR team had no clear leader, one student was recognized for often taking a lead role. In the WD project group, all students agreed STEM students took the lead, but no one student was identified as the leader. As in the VR project group, roles within the WD project group were not clearly defined but were assigned based on individual strengths. The VR team and the STEM members of the WD team reported very positive overall experiences with the program. All students said that working in interdisciplinary teams was beneficial because of the different perspectives they contributed from different fields.

Students recommended that in future iterations of these kinds of group projects, clearer roles be delineated for students from different disciplines, with recognition of the external constraints such as differences in time commitment. Despite the challenges students experienced, all students said that they would recommend this program to others and would participate in similar programs. While students had different "most important takeaway" comments, common themes were that communication is very important in teamwork and that through this program, they learned to work with people who think differently than they do.

DISCUSSION

Group Dynamics

Both project groups were challenged by personality differences and scheduling in the beginning. Many students also stated that poor communication between team members was an issue. During the structured team meeting and feedback reflection session, the program evaluator gave both groups the same advice about keeping all members focused on their goals. It was suggested that the STEM students send short summaries of what was done each day to the BSN students and give an indication of what help was needed from the BSN students. While the BSN students had very demanding schedules including classwork and clinicals, staying updated on the project helped BSN students to remain involved in the process and to feel like part of the team. The intervention improved confidence in collaboration skills for both project groups, as indicated by QIS. However, behavioral evaluations show that the VR project group showed improvement in their actions for collaboration whereas the WD project group members did not.

Leading up to the guided reflections and team meetings, members of the VR team struggled with interrupting teammates, indicated via the collaboration items in the behavioral assessments. This factor was discussed during the intervention by the program evaluator, and solutions were proposed to ensure that all members of the team were able to contribute to the project. This intervention resulted in an increased confidence in collaboration for the VR project group members, according to the QIS and behavioral evaluations. Members of this team also referenced this intervention during semi-structured interviews. One group member reflected on this significant meeting as "what really gave people what they needed to work on and kind of solidified everyone's idea of what the group should be. Obviously, it helped us work better together. Now, I feel like we have no issues." Other team members suggested that it made a big difference in their ability to work cooperatively as an interdisciplinary team.

While members of the WD project group reported improved confidence in collaboration skills following the intervention, semi-structured interviews revealed that BSN students did not remain involved in this part of the project or presentation and that the team essentially divided by discipline. This team division may have also contributed to reduced commitment by the team as a whole. Because our observations are based on two teams who worked on different problems, we cannot disentangle the impact of the problem characteristics from the personalities of the students on each team. The VR project needed the knowledge that the BSN students had in order to proceed. While the WD project was initially dependent

on the experiences and knowledge of the BSN students, the technology and engineering training of the STEM students became central when the product development began. In the post-fellowship interview, we asked students a hypothetical question: "If you had the same teammates but were tasked with the other project, what do you think your summer experience would have been like?" The students working on the VR project felt that their team would work just as well together, but that the WD project would have been more technologically challenging. They also claimed that BSN students would have had a bigger role up front but that it might have been harder to stay involved. Conversely, students working on the WD project felt that the VR project would have made it easier for the BSN students to get involved and that the project had a more level playing field. The WD team also felt their team would have functioned similarly with the other project.

Differences in Skill Sets

While STEM majors are known to be good problem solvers (Council of Canadian Academies, 2015), students in BSN programs are rigorously trained in interprofessional collaboration (Behan & Van Der Like, 2017; Schwartz et al., 2019; Sowko et al., 2019). These observations align with our results that show the STEM students having better communication and critical thinking skills, while the BSN students' self-evaluation of collaboration skills was somewhat, but not significantly higher than the STEM students. Interpretation of these observations in our study must take into account that the fellowship required a substantially greater time commitment from STEM students than the BSN students, creating a challenging situation for the BSN students.

Feedback and Team-Based Learning

While peer evaluations are commonplace in many class-based projects, it is rare that students see the evaluations that others filled out for them. We combined self-evaluation and peer assessment to provide students with regularly scheduled feedback that could help them understand their self perception as well as the perceptions of others. We observed that with frequent, scheduled feedback, students became comfortable both giving and receiving feedback, which is well supported by previous studies (Hattie & Timperley, 2007; Poulos & Mahony, 2008; Bailey & Garner, 2010). At first, students noted that it was difficult not to take comments personally, but over time they realized this was helping them become better presenters and to work better as a team. Offering students the opportunity to consider self- and peer-perceptions from the same time frame allowed for reflection and greater awareness of their behaviors.

Individual feedback reflections were submitted to Canvas, UAB's online learning management system, at weeks 7 and 9. Students reported that feedback was helpful for them to become aware of strengths and weaknesses. As previously mentioned, members of the VR project group reported that the group feedback meeting helped the team to understand one another better. They began actively supporting each other during group meetings and in efforts to meet their goals. Several students commented that long-term, this feedback would help them make improvements for their behavior in a team and that they would continue to work in teams throughout their careers.

Maximizing Students' Benefit

In future iterations of this program and in similar innovation experiences, we can maximize benefit to students through careful consideration of program structure and team formation. Feedback from the semi-structured interviews revealed that students enjoyed the freedom given to develop their projects, but at times they felt lost and unsure about how to proceed. Additional structure, including more benchmarks and clear expectations would have helped students to establish goals early on in the program and to make faster progress on their projects. Students also commented that having projects with clear opportunities for different skill sets may have benefited team dynamics and ensured all students could remain involved with the project. As discussed above, we observed this our project groups, where one project relied heavily on BSN students toward the start but eventually got to a point where their expertise was no longer required to move forward. On the contrary, the other project required BSN student knowledge throughout the project, which helped these students to stay involved. Students also expressed interest in developing teams with

more equitable time commitment to improve team dynamics. The differential time commitment of BSN and STEM students created a challenging context for teams to work together.

Using the Assessment Toolkit

In the context of an interdisciplinary innovation challenge, we combined peer and evaluator feedback to students with rigorous assessment of the program's impact to provide an assessment framework on which other educators and researchers can build. This toolkit can be used in innovation challenges across disciplines to assess student growth in important "soft skill" areas: collaboration, communication, creativity, and critical thinking. The QIS can be used to assess confidence in these skill areas, and the behavioral assessments allow investigators to understand how effectively students are practicing these skills. The semi-structured interviews gave noteworthy insight into the experiences of the students and provided valuable feedback for future iterations of this program. The frequency of feedback helped students to understand their role in their teams. Guided reflections and team interventions were especially impactful for improving team dynamics.

As the Presidential Summer Clinical Innovation Fellowship Program was small, it gave us the opportunity to explore issues of teaching teamwork and presentation skills more intensively. In our capacity, with our faculty and staff team members, we were able to implement all of these assessments. Some of these assessments can be administered digitally and scored automatically, with feedback forms compiled according to a template. These assessments can be used in coursework across disciplines to understand soft skill development and assess team dynamics. We have begun to implement the instruments in interdisciplinary classroom settings that focus on design thinking or innovation. For classroom use, the toolbox can be used in pieces or in its entirety. While semi-structured interviews are more difficult to complete, due to the intense time involved in interviewing and transcribing interviews, the use of online quizzes or discussion boards on learning management systems may be useful for select questions or reflections. The semi-structured interviews are more in depth and may also be desirable for program development.

Feedback is a powerful tool that encourages and supports student development. The use of this assessment toolkit, combined with the structure of our program, involved frequent feedback that students recognized as important for improving team dynamics and for understanding how they were perceived in group settings, ultimately influencing their experiences in team-based projects moving forward. Leveraging individual and team feedback in the classroom can help students to become effective leaders with skills in communication, collaboration, creativity, and critical thinking.

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REFERENCES

Altman, M., Huang, T., & Breland, J. (2018). Design Thinking in Health Care. *Preventing Chronic Disease*, *15*. https://doi.org/10.5888/pcd15.180128

Bailey, R., & Garner, M. (2010). Is the feedback in higher education assessment worth the paper it is written on? Teachers' reflections on their practices. *Teaching in Higher Education*, *15*(2), 187-198. https://doi.org/10.1080/13562511003620019

Behan, K., & Van Der Like, J. (2017). Introducing Interprofessional Education to BSN and CLS Students Using a Simulated Healthcare Setting. *American Society for Clinical Laboratory Science*, *30*(4), 224-227. https://doi.org/10.29074/ascls.30.4.224

Beier, M., Kim, M., Saterbak, A., Leautaud, V., Bishnoi, S., & Gilberto, J. (2018). The effect of authentic project-based learning on attitudes and career aspirations in STEM. *Journal of Research in Science Teaching*, *56*(1), 3-23. https://doi.org/10.1002/tea.21465

Berry, J., Noles, K., Eberhardt, A., & Wingo, N. (2019). Accelerating Clinical Innovation in Biomedical Engineering Education by Using a Digital Portal for Collaboration. *Journal of Biomechanical Engineering*, *141*(12). https://doi.org/10.1115/1.4045089

Braun, M. (2017). Comparative Evaluation of Online and In-Class Student Team Presentations. *Journal O\of University Teaching & Learning Practice*, *14*(3). Retrieved from https://ro.uow.edu.au/jutlp/vol14/iss3/3/.

Council of Canadian Academies. (2015). *Some Assembly Required: STEM Skills and Canada's Economic Productivity*. Ottawa: The Expert Panel on STEM Skills for the Future, Council of Canadian Academies. Retrieved from https://cca-reports.ca/wp-content/uploads/2018/10/STEMExecSummEn.pdf

Harkema, S., & Schout, H. (2008). Incorporating Student-Centred Learning in Innovation and Entrepreneurship Education. *European Journal O\of Education*, *43*(4), 513-526. https://doi.org/10.1111/j.1465-3435.2008.00372.x

Hattie, J., & Timperley, H. (2007). The Power of Feedback. *Review of Educational Research*, *77*(1), 81-112. https://doi.org/10.3102/003465430298487

Havyer, R., Wingo, M., Comfere, N., Nelson, D., Halvorsen, A., McDonald, F., & Reed, D. (2013). Teamwork Assessment in Internal Medicine: A Systematic Review of Validity Evidence and Outcomes. *Journal of General Internal Medicine*, *29*(6), 894-910. https://doi.org/10.1007/s11606-013-2686-8

Kelley, T., & Kelley, D. (2013). *Creative confidence: Unleashing the creative potential within us all*. Crown Business.

Morphet, J., Hood, K., Cant, R., Baulch, J., Gilbee, A., & Sandry, K. (2014). Teaching teamwork: an evaluation of an interprofessional training ward placement for health care students. *Advances in Medical Education and Practice*, *197*. https://doi.org/10.2147/amep.s61189

National Education Association. (2017). *An Educator's Guide to the "Four Cs": Preparing 21st Century Students for a Global Society*. Retrieved from http://www.nea.org/tools/52217.htm

Nicol, D., Thomson, A., & Breslin, C. (2013). Rethinking feedback practices in higher education: A peer review perspective. *Assessment & Evaluation in Higher Education*, *39*(1), 102-122. https://doi.org/10.1080/02602938.2013.795518

Parker, A., Lewis, G., & Scott, M. (2020). Improving Technical Communication with a Cue Awareness Intervention using Poster Presentations. *Proceedings of the 4Th Conference on Computing Education Practice 2020*. https://doi.org/10.1145/3372356.3372361

Pellegrini, J., & Jansen, E. (2013). The Mayo Innovation Scholars Program: Undergraduates Explore the Science and Economics of Medical Innovations. *Journal of College Science Teaching*, *42*(4), 28-32. Retrieved from https://www.jstor.org/stable/43631917.

Poulos, A., & Mahony, M. (2008). Effectiveness of feedback: the students' perspective. *Assessment & Evaluation in Higher Education*, *33*(2), 143-154. https://doi.org/10.1080/02602930601127869

Reynolds, J., & Russell, V. (2008). Can You Hear Us Now?: A comparison of peer review quality when students give audio versus written feedback. *The WAC Journal*, *19*, 29-44. Retrieved from https://wac.colostate.edu/docs/journal/vol19/reynolds_russell.pdf.

Schwartz, L., El-Banna, M., Conroy, J., & Browne, J. (2019). What's Your Style? Enhanced Interprofessional Communication and Practice Using the Communication Wheel. *Nurse Educator*, *44*(1), 20-24. https://doi.org/10.1097/nne.0000000000000509

Sowko, L., Fennimore, L., & Drahnak, D. (2019). Teaching Workplace Interprofessional Communication to Undergraduate Nursing Students. *Journal of Nursing Education*, *58*(9), 538-542. https://doi.org/10.3928/01484834-20190819-08

Stolzenberg, E., Eagan, K., Romo, E., Tamargo, E., Aragon, M., Luedke, M., & Kang, N. (2019). *The American Freshman: National Norms Fall 2018*. Los Angeles: Higher Education Research

Institute UCLA. Retrieved from https://www.heri.ucla.edu/monographs/TheAmericanFreshman2018.pdf

Wei, X., Liu, X., & Sha, J. (2019). How Does the Entrepreneurship Education Influence the Students' Innovation? Testing on the Multiple Mediation Model. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.01557

APPENDIX A
BEHAVIORAL ASSESSMENT SURVEYS

ID: _____ Date: _____

Behavioral Self-Assessment

Please rate the following, considering student behavior throughout the week:
0= Never, 1= Rarely, 2= Sometimes, 3= Often, 4=Always

Communication	Never				Always
I contribute substantively to the team discussion	0	1	2	3	4
I share ideas with people in positions of power	0	1	2	3	4
I interrupt my teammates	0	1	2	3	4
I encourage my teammates	0	1	2	3	4
I am respectful of others' ideas	0	1	2	3	4
I summarize/paraphrase the comments of others	0	1	2	3	4
I adjust my communication to audience or context	0	1	2	3	4
Ways to Contribute					
I troubleshoot effectively	0	1	2	3	4
I consider future roadblocks and potential "wins"	0	1	2	3	4
I am stalled by challenges	0	1	2	3	4
I change approaches when stalled	0	1	2	3	4
I work hours beyond what is required	0	1	2	3	4
I bring excitement to the team and project	0	1	2	3	4
I stretch beyond my comfort zone	0	1	2	3	4

I consider problems from various angles	0	1	2	3	4
I organize ideas and information well	0	1	2	3	4
I focus on the big picture	0	1	2	3	4

What is my greatest strength?

In what area do I have the greatest room for improvement?

Student: _____ Date: _____
Your ID: _____

Behavioral Peer-Assessment

Please rate the following, considering student behavior throughout the week:
0= Never, 1= Rarely, 2= Sometimes, 3= Often, 4=Always

Communication

My teammate contributes substantively to the team discussion	0	1	2	3	4
My teammate shares ideas with people in positions of power	0	1	2	3	4
My teammate interrupts other team members	0	1	2	3	4
My teammate encourages other team members	0	1	2	3	4
My teammate is respectful of others' ideas	0	1	2	3	4
My teammate summarizes/paraphrases the comments of others	0	1	2	3	4
My teammate adjusts communication to audience or context	0	1	2	3	4

Ways to Contribute

My teammate is able to troubleshoot effectively	0	1	2	3	4
My teammate considers future roadblocks and potential "wins"	0	1	2	3	4
My teammate is stalled by challenges	0	1	2	3	4
My teammate changes approaches when stalled	0	1	2	3	4
My teammate works hours beyond what is required	0	1	2	3	4
My teammate is excited to participate in the project	0	1	2	3	4
My teammate stretches beyond his or her comfort zone	0	1	2	3	4
My teammate considers problems from various angles	0	1	2	3	4
My teammate organizes ideas and information well	0	1	2	3	4
My teammate focuses on the big picture	0	1	2	3	4

What is this teammate's greatest contribution?

In what area does this teammate have the greatest room for improvement?

APPENDIX B
QUALITIES OF AN INNOVATOR SURVEY

ID: _____ Date: _____

Qualities of an Innovator Survey

How important is it to you…

1= not at all, 2= a little, 3=somewhat, 4= fairly important, 5= highly important

A. To avoid failure	1	2	3	4	5
B. To choose your own problems	1	2	3	4	5
C. To successfully complete a task	1	2	3	4	5
D. To potentially make a discovery or solve a problem	1	2	3	4	5
E. To get individual credit for your ideas	1	2	3	4	5
F. To avoid conflict with others about ideas or strategy	1	2	3	4	5
G. To be sure that your efforts will produce results	1	2	3	4	5
H. To have a clear role	1	2	3	4	5

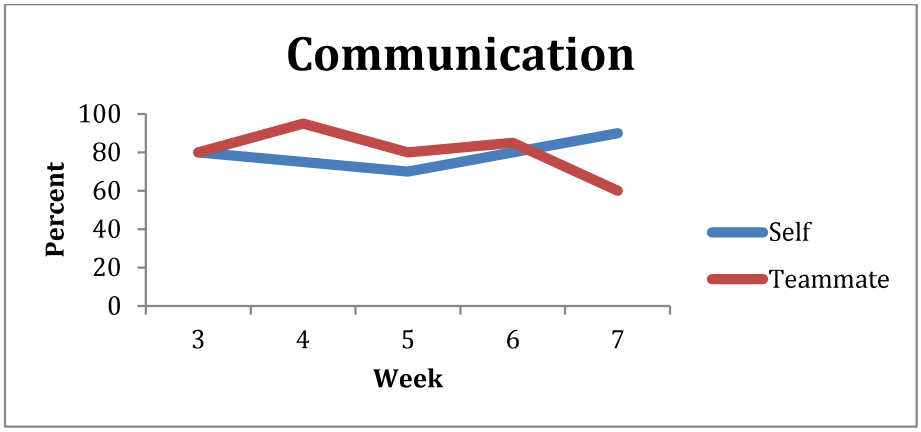
How confident are you that you can…

1= not at all, 2= a little, 3=somewhat, 4= fairly confident, 5= highly confident

A. Work effectively as part of a team	1	2	3	4	5
B. Contribute innovative ideas to a team	1	2	3	4	5
C. Develop an effective strategy for approaching a problem	1	2	3	4	5
D. Tolerate setbacks without giving up	1	2	3	4	5
E. Move forward when the path to solution is not clear	1	2	3	4	5
F. Really listen to the ideas of others	1	2	3	4	5
G. Effectively redirect a discussion	1	2	3	4	5
H. Connect ideas from different contexts	1	2	3	4	5
I. Ask questions that lead to examining things in new ways	1	2	3	4	5
J. Identify problems that need solving	1	2	3	4	5
K. Offer useful ideas for solving problems in my discipline	1	2	3	4	5
L. Offer useful ideas for solving problems outside my discipline	1	2	3	4	5
M. Develop creative solutions	1	2	3	4	5
N. Develop a compelling presentation	1	2	3	4	5
O. Behave professionally in a high stakes situation	1	2	3	4	5
P. Present ideas to persons in power	1	2	3	4	5

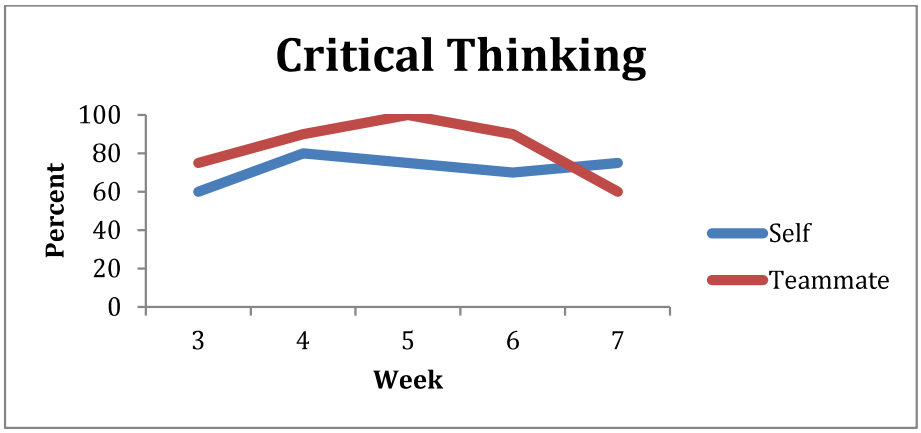
APPENDIX C
EXAMPLE OF WRITTEN FEEDBACK GIVEN TO STUDENTS AT WEEKS 6, 8, AND 10

I. Areas of Assessment
Communication



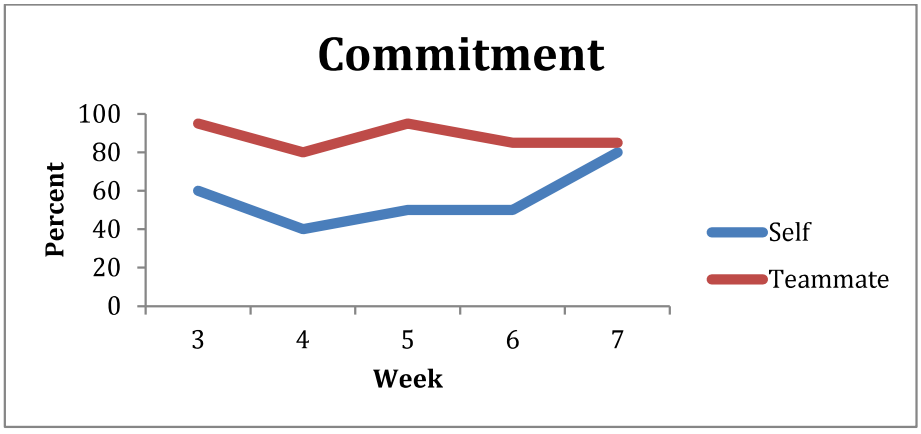
Consistencies and Inconsistencies:
This student consistently does a good job of listening to others and never interrupts. He/she is very encouraging of his/her teammates.
The area of greatest inconsistency is in paraphrasing and summarizing the comments of others.
Additional Comments:
(Week 3)- This teammate is quiet
(Week 4)- This teammate is always cognizant of other people's time and "talking space" and never interrupts
(Week 7)- This teammate has improved his/her communication skills

Critical Thinking



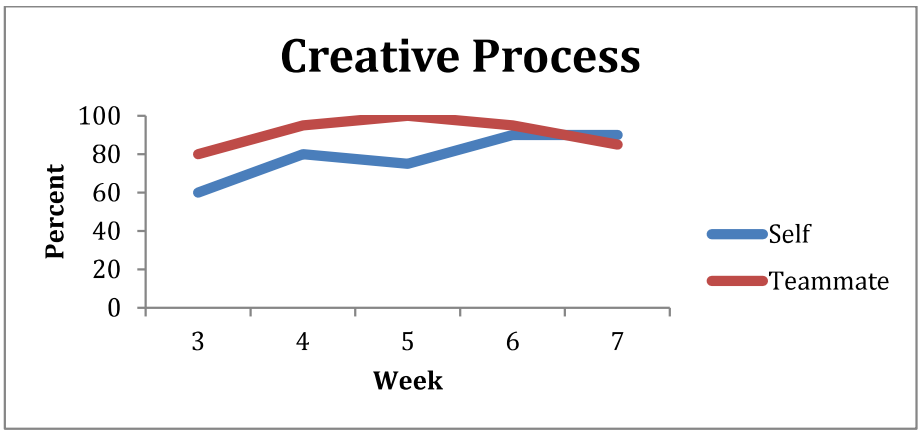
Consistencies and Inconsistencies:
This student is often good at troubleshooting. He/she is inconsistently stalled by challenges but often changes his/her approach when he/she is stalled.

Commitment



Consistencies and Inconsistencies:
This student consistently reports infrequently bringing excitement to the project and the team, but his/her teammates consistently strongly feel that this student brings excitement to the team! He/she often stretches beyond his/her comfort zone.
Additional Comments:
(Week 3)- The project is definitely out of his/her comfort zone and he/she is rising to the challenge

Creative Process



Consistencies and Inconsistencies:
This student is good at keeping the big picture in mind. His/her teammates see that this student organizes ideas and information well, but he/she only thinks he/she does this well some of the time.
Additional Comments:
(Week 4)- This student has good intuition about the next steps in the project
(Week 7)- This student looks ahead and sees the big picture

II. Strengths and Weaknesses

You have identified the following as your greatest strengths:
Week 3- My greatest strength is note-taking and considering future goals/deadlines/benchmarks
Week 4- I am good at planning next steps

Week 6- My greatest strength is being very diplomatic and organized
Week 7- I am good at taking notes

Your teammates have identified the following as your greatest strengths:
Week 3- Organization/documentation, gathering data and statistics from clinical realm, Research, summary, communication, ideation, task management
Week 4- They offer a lot of feedback and research to the project that allows for timely progression, Organization of data, notes, presentation ideas
Week 5- Taking meeting notes and writing up prototyping study protocol documentation
Week 6- They have offered a lot of feedback and help that has allowed the presentations to run very smoothly, Creating and organizing notes, agendas, and documents
Week 7- He/she is still very great at taking notes and he/she is improving with communication

You have identified the following as an area with the greatest room for improvement:
Week 3- Communicating with people outside my team- I always ask another group member to send emails as opposed to doing it myself
Week 4- I need to be better at communicating
Week 6- Communicating to people outside my team
Week 7- I need to be better at presenting

Your teammates have identified the following as an area with the greatest room for improvement:
Week 3- Confidence in ideas/speaking up more, Being assertive, email communication, willingness
Week 4- Speaking ideas out loud, This teammate is sometimes quiet during conversations; they have gotten better with time though
Week 5- Speaking up in meetings
Week 6- This teammate has sometimes been quiet during conversations on discord, but has gotten significantly better through the progression of the presentations, Increase confidence when talking in meetings or in written communication
Week 7- He/she could work on speaking up when he/she has ideas to contribute

III. Action Plan
Based on the feedback you've received, identify specific areas in which you'd like to improve:

What steps will you take over the next week to improve in these areas?