

Using ePortfolio for Team-Based Transformational Learning Experiences in a Health Education Course

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High-impact educational practices, including team-based learning (TBL) and the use of ePortfolio technology, have been demonstrated to support student learning. This project used a mixed-methods, pre- and post-semester design to examine the combined effect of TBL and the use of team ePortfolios as collaborative workspaces in an upper-division, undergraduate Health Education: Theory and Practice course. Quantitative findings show that students experienced statistically significant increases in their health education competencies and confidence working as health educators, over the course of the semester. Qualitative findings illustrate that students found TBL and the use of a well-integrated ePortfolio effective in supporting their skill development as members of collaborative teams and future health educators. Together, these findings suggest that ePortfolios can be effectively used to create shared online workspaces, support TBL, and develop students' skills in many disciplines.

Health Education: Theory and Practice is an upper-division course taken by all Bachelor of Science in Health Science (BSHS) majors at the University of Alaska Anchorage (UAA). Approximately 25% of BSHS students graduate with a Health Educator concentration and seek employment in a health promotion field. Nursing and physical education students also enroll in the course, which is cross-listed to fulfill requirements or serve as an elective for their degree programs. Health Education: Theory and Practice (i.e., Health Education) is the only health education or health promotion-focused class in the BSHS curriculum and serves a vital purpose in training future health practitioners and health educators, many of whom will later pursue the Certified Health Educational Specialist (CHES) credential. The revised course design described in this article was piloted in a class with 28 students from the Bachelor of Science in Health Sciences, Physical Education, and Nursing programs.

Health Education is offered annually. In the Spring 2016 semester, the course was taught in a new way, emphasizing team-based learning (TBL) and the application of theory to improve students' understanding of health education theory and practice. The venture into TBL was new for the department, as was the use of electronic portfolios (ePortfolios) as a space for students to display their project artifacts and to collaborate as a team.

The ePortfolio tool was selected for the course to help students build on prior work, to integrate their academic and experiential learning, and to encourage them to take responsibility for their own learning (Bierer et al., 2008; Hayward et al., 2008). UAA uses a locally branded ("eWolf") ePortfolio system with Digication as a mechanism for students to "integrate learning, showcase [their] work, and reflect on [their] progress" (Academic Innovations & eLearning, 2018,

eWolf ePortfolio section). Assessment of student performance relied heavily on ePortfolio technology, with student teams collaboratively curating 10 assignments, using in-class presentations to showcase their interventions on the site, and submitting all artifacts of their health education interventions for grading and storage through the platform.

Literature Review

The existing research on TBL and the use of ePortfolios focuses primarily on identifying the key components of an ePortfolio needed to demonstrate student learning outcomes, as well as integrating the tool in such a way that requires students to think critically, systemically, and practically. This literature connects to TBL by demonstrating ePortfolio as a best-practice for high-impact learning (Kuh, 2008; Watson et al., 2016). TBL in an ePortfolio provides students with a "digital space where [they] compose digital artifacts, negotiate with multiple audiences, and develop digital identities" (Benander & Refaei, 2016, p. 71). As a high-impact practice, the use of ePortfolio for TBL in Health Education focused on assessment and evaluation of artifacts that demonstrated evidence of students' learning and collaboration with the members of their team.

Benander and Refaei (2016) also noted that although "ePortfolios demonstrated a range of learning through the collection of artifacts, . . . instructors also indicated that they wanted the ePortfolio authors to be clearer about their intended purpose for the ePortfolio" (p. 77). Purposefully integrating theory and practice work into a Health Education ePortfolio space provides both a challenge and a benefit to students and faculty alike. New technologies in the classroom are shown to increase the workloads of new users (Cordier et al., 2016). To overcome student resistance around the adoption of new ePortfolio technology, it is necessary

for instructors to emphasize the value of ePortfolio and share best practices for using the tool to meet course learning objectives with students. The practice of aligning course expectations and/or learning outcomes within the ePortfolio is a necessary strategy when implementing ePortfolio for a course. Scholz et al. (2017) noted that “misalignment . . . may detract from the ePortfolio learning experience, yet we must be equally aware that alignment and misalignment do not result unequivocally in successful or unsuccessful experiences for students” (p. 149).

Developing an ePortfolio creates an opportunity for students to build their confidence and competence, as well as demonstrating learning by providing flexibility, cultivating an instructor and peer-supported learning environment, and offering students the opportunity to build self-regulated learning skills (Ciesielkiewicz, 2019). For the course described here, students were encouraged to engage and develop digital learning skills as a group through a technology-based focus. Each team was required to create a group ePortfolio and negotiate a workflow.

The artifacts in the ePortfolio included work from each student team member, presented as a single cohesive product. Brown (2015) noted that “as they negotiate digital spaces, students are not only creating content—they are constructing their ethos using an entirely new set of rhetorical tools” (p. 337), which is evident through the design of group portfolios in the Health Education course that showcased the work done.

Students developing an ePortfolio for TBL purposes build collaboration skills with the potential to transfer from the classroom to the workforce. Students noted that the Health Education course required them to learn “how to collaborate within a team and improve ideas by building off of each other’s strengths,” echoing Perks and Galantino’s (2013) discussion of ePortfolio use in a capstone project for a holistic health minor.

Arntfield and colleagues (2016) identified the value of mentorship and reflective writing-based portfolios to meaningfully engage students in “learning activities through interaction with others and worth-while tasks” (p. 202). Their research focused on the value of student-mentor engagement, but the model can also be used in TBL environments to meet curriculum-based learning outcomes when the artifacts built in an ePortfolio demonstrate “widespread and well-studied curricular innovation made in response to competence-based medical education movement and its associated need for reflective skills in medical education” (Arntfield et al., 2016, p. 203). Using ePortfolio to provide a collaborative workplace for TBL in Health Education expanded the purpose and function of ePortfolio beyond that of an assessment tool for examining student learning outcomes, to support transformative learner experiences that prepare students for practice.

Hastings et al.’s (2014) work with users developing Professional Practice Portfolios (PPP) showed that a sense of accomplishment, experiential learning, skills and accountability, and a best practice were the value markers for students when documenting knowledge through reflection and artifacts in their PPP. Development of a PPP for healthcare disciplines exposed students to leadership competencies and helped them demonstrate organization, accountability, and professionalism. While the authors did not provide additional detail about what might go into a PPP, the Health Education course in this study used ePortfolio to capture artifacts such as presentations, health education videos, health education pamphlets and posters, and research papers related to a chosen health topic.

Using the ePortfolio tool to support TBL allowed the students to work in one tool simultaneously to develop and share artifacts, leading students to develop interpersonal communication, goal setting, and advocacy skills, which will be key to their success in the health workforce.

Pedagogical Approach

As a high-impact educational practice, TBL has shown promise in health professions education (Fatmi et al., 2013; Hall et al., 2012) and was selected as a framework for the revised Health Education course. TBL is a pedagogical method that integrates application-oriented teaching with group learning, inviting teams of students to apply course material through problem-focused tasks, such as the development of health education interventions. Student TBL teams have a stable roster to increase accountability and provide students with the opportunity to practice collaborating, giving and receiving constructive feedback, and having “co-workers” whose performance is critical to completing a task (Haidet et al., 2014; Sisk, 2011). TBL is considered a high-impact educational practice because learners in TBL courses have shown higher self-efficacy and interest in the course, improved class participation, and improved student knowledge of course material and performance (Fatmi et al., 2013; Hall et al., 2012).

ePortfolios were used to collect evidence of student learning and allow students the opportunity to analyze and present their learning experiences at the end of the course. Each team of two to five students created a shared ePortfolio over the course of the semester, compiling all team assignments for the class. At the end of the semester, each team’s ePortfolio included a health problem statement, eight health education interventions designed to demonstrate a single theoretical framework (i.e., health belief model or transtheoretical model) per intervention, all the health education materials developed to support those interventions, and a final integrative project.

High-impact educational practices, including TBL and use of ePortfolio, are practices that have been found to reliably increase rates of student retention and engagement (Kuh, 2008). This course's redesign incorporated a pedagogical inquiry focused on exploring whether the use of two high-impact educational practices (TBL, ePortfolio) supported students' understanding of health education theory and practice and their confidence seeking employment as future health education professionals. This effort also built on the themes of authentic learning by incorporating student empowerment through choice of topic, requiring discourse among team members in designing materials and interventions, and providing assignments designed to replicate real world problems and engage team members in the work of Health Educators (Rule, 2006).

The project was approved by the UAA Institutional Review Board as part of a larger Making Learning Visible project under IRB approval #849238-2.

Implementing the Redesign

Health Education was the instructor's first course in implementing the ePortfolio tool, meaning the students and instructor were learning together. The ePortfolio tool was introduced as a space where team members could develop content simultaneously, as well as collect artifacts of their learning. In addition, the ePortfolio tool's design elements provided students with the opportunity to create aesthetically pleasing health education materials, building skills they will need in future practice.

Success with the experiential TBL framework relied on teams organized around common health education interests. Instead of the instructor assigning students to groups—as traditional in TBL—students self-selected into groups around health problems of interest to them, consistent with the authentic learning principle of student empowerment through choice (Rule, 2006). The process of selecting a topic began the first week of class when students worked through a free-writing, brainstorming, and rank-ordering exercise to identify health problems they were interested in. At the second class meeting they shared their "short list" of preferred topics with the class, allowing them to identify students with similar interests and form problem-based teams. Teams chose health topics including childhood obesity, diabetes prevention and management, and intimate partner violence.

The course design emphasized the importance of team-based, experiential learning with an aggressive assignment schedule, including 10 group projects due across the 16-week semester worth 75% of the available points in the course. The proportional assignment of points highlighted the integral relationship between the

teams' work product and individual students' ability to earn a high grade in the class. There was a very high workload in this class with detailed assignments due roughly once per week within each team's ePortfolio. The assignment frequency pushed teams to share work, delegate to one another, and build skills to produce health education and promotion materials under resource-constrained conditions, as professional health educators are often tasked to do. It was also important to provide team members with individual accountability, which was done via three structured opportunities for team members to evaluate one another's participation and contributions throughout the semester. The peer assessment process kept the students accountable for their individual contributions and gave them the opportunity to learn from and respond to their teammates' feedback.

The course met twice a week for 75 minutes each day, totaling 150 minutes of class time per week. At the beginning of the semester, the instructor spent one period in traditional lecture/activity instruction activities; teams presented their work during the second 75-minute period. Unfortunately, this pattern hindered rather than helped students, who struggled to find time to meet out of class and were distracted by ad hoc, in-class group exercises. Based on feedback from students, beginning in week four, the instructor limited lectures to 15 minutes per week and the class utilized the other 125 minutes for team collaboration to develop their project work and update their ePortfolio (50 minutes) and weekly project presentations from their completed ePortfolio sections (75 minutes). Shifting how class time was used dramatically improved student learning and satisfaction as measured through in class feedback.

While making space for the teams to engage in inquiry activities and work together to solve real problems was more productive than asking them to spend time listening to lectures or working through exercises, radically shifting the way the course was taught was stressful for the instructor. To assess how the redesign was working for the students, in week eight of the course they completed one forced-choice question asking whether (a) the instructor should spend more time covering material, (b) the instructor should give them more time to work in teams, or (c) whether the status quo was effective. A total of 74% of student respondents selected the option indicating "There is a good balance between time we spend with the instructor covering material with us in class and time to work in our groups," confirming that students felt working collaboratively to apply course material was beneficial to student learning.

It was useful to see that a substantial majority of students participating in the midterm evaluation process thought the course's approach to grappling with novel material struck a useful balance. The

instructor leaned on that reassurance as the semester continued, teaching new material for approximately 15 minutes each week, then loosing the teams to focus on their work together while providing individualized coaching to teams who wanted assistance and answering questions. Student teams made good use of their time together—as demonstrated during their presentations to the class each week—and used their team ePortfolio as a central tool for team collaboration. During each week’s presentation, students logged into the ePortfolio system on the classroom computer and projected their team’s portfolio to provide the visuals for their presentation.

The final key to making the ePortfolio-heavy, TBL course design succeed was explicitly telling students why they were working in teams and using the ePortfolio tool. There was a great deal of resistance to the idea of group projects at the beginning of the semester, but it softened when the instructor emphasized that one of the goals for the course was to help them learn to work more effectively together because health education and health promotion work are inherently group projects in the real world. Sharing that teamwork was key to carefully developed pedagogical plans, and that the artifacts they created in the team ePortfolio were similar to those they would create as practicing health educators, was crucial to securing student buy-in.

Students benefited from using ePortfolio as a shared collaboration space, where teams could simultaneously work. Students’ ability to see their teammates’ work as it was being completed and build on one another’s work in real time was critical to their productive collaboration. This highlighted each student’s ownership of the health education products created and how the skills they were developing would transition to the health education workplace. By using ePortfolio as a tool in conjunction with the TBL course design, students participated in inquiry-based collaboration and developed their skill and confidence as future health education professionals.

Methods

The goal of this evaluation was to examine the effects of TBL emphasizing hands-on learning and the creation of health education products using ePortfolio tools on students’ self-efficacy as health educators and their confidence seeking employment as health education professionals.

Sample

28 undergraduate students from the Bachelor of Science in Health Sciences, Physical Education, and

Nursing programs participated in this course. Nine participants were male, 19 participants were female (this is a typical gender distribution for upper division health sciences classes at UAA). All 28 participants provided pre-test quantitative data; 25 completed the quantitative post-test and shared qualitative feedback at the end of the semester.

Data Collection

The study used quantitative and qualitative methods and a pre- and post-test design, with data collected in the first and last class meetings. The informed consent document specified students could opt their data out of the research project; no participants elected to do so.

Quantitative Data Collection

Students completed Hopla’s (2014) 18-item adaptation of Schwarzer and Jerusalem’s (1995) General Self-Efficacy (GSE) scale at the beginning and end of the semester. Hopla’s (2014) modified measure centers the GSE around the seven core competencies of health educators derived from the National Health Educator Competencies Update Project (Sharma & Romas, 2008).

The modified GSE includes 18 questions assessing student’s self-efficacy around seven core competencies in health education on a 5-point Likert scale (4 = *great*, 0 = *none*). Two example questions are: “To what extent am I prepared to plan interventions for health education?” and “To what extent am I prepared to advocate for health?” The GSE has demonstrated high reliability, stability, and construct validity in the literature (e.g., Schwarzer et al., 1999). Hopla’s (2014) modified scale showed an inter-item reliability with a Cronbach’s alpha of .83.

For this project, the instructor added two questions assessing students’ self-efficacy around employment as health educators: “How confident would you be seeking work as a health educator *today*?” and “How confident are you in your ability to work as a health educator *today*?” These confidence questions used a 0-3 Likert scale, with answers ranging from *not at all confident* to *very confident*.

In addition, each student completed a mid-term course evaluation in week eight of 16, which included one forced-choice question asking whether, “We should spend more time covering material with the instructor and less time working in teams,” “There is a good balance between time we spend with the instructor covering material with us in class and time to work in our groups,” or “We should spend less time covering material in the class and have more time to work in our teams.”

Qualitative Data Collection

Qualitative feedback was collected from students throughout the semester, both in class and via team contribution assessments completed outside of class. The team contribution assessments were done in weeks seven, 12, and 16 (after every three team assignments) to collect substantive feedback from students on one another's contributions to the team's learning and products. In addition, at the end of the semester, students were asked to describe their key takeaways from the course.

The team contribution assessment rubrics had three sections. The first asked each student to rate every member of their group, including themselves, on five components using a 6-point Likert scale: contributions, quality of work, time management, working with others, and commitment. The second asked each student to provide at least one specific comment for each of their teammates and divide 100 points between the members of their team in a way that indicated proportionally how much credit each person should receive. The third asked students to comment on the team's function and learning as a whole; only comments about the team as a whole were reviewed as part of this inquiry. Individual data for each student, including their teammates' comments and assessment of their quality of work, time management, etc., was shared with students at each data collection point and used to determine participation grades for the course.

Data Analysis

Quantitative Analyses

Total scores were calculated by summing the responses to all 20 questions (18 from the modified GSE, two confidence questions). Possible scores ranged from 0 to 78 (all questions have a zero option); competency questions ($n = 18$) are on a 0-4 scale, confidence questions ($n = 2$) are on a 0-3 scale. Scores for the seven competencies were calculated by summing the scores to individual questions, then dividing by the number of questions associated with that competency (denominators varied between 1 and 4).

Qualitative Analyses

Qualitative feedback from students assessing their perception of the course and their learning was analyzed using emergent thematic coding and using simple frequency counts to establish the frequency of common words and ideas. The unit of analysis was the individual student. Common themes around skill development and use of ePortfolio emerged across student responses and throughout the semester.

Results

Quantitative Findings

Pretest total scores ranged from 11 to 69, showing students perceived a wide range in their competence and confidence as health educators at the beginning of the semester. Post-test total scores ranged from 27-78; the highest possible score on the measure is 78, which required universal answers of *great competence* and being *very confident*. Because total scores included this highest-possible score, it is important to acknowledge that the measure was range restricted.

Despite the use of a range restricted measure, there was an increase in the minimum score on each competency, mostly from 0 to not-zero. The means for each competency and for students' confidence increased substantially, averaging a 1.19-point increase on a 5-point scale (24% of possible range) for each of the seven competencies and a 0.89-point increase on a 4-point scale for confidence (22% of possible range). Total scores also had a significant mean increase from 36.57 to 59.84 ($\alpha = 0.01$). Further analyses using paired samples *t* tests to assess whether the change in the means across the semester was significant found the differences were statistically significant ($\alpha = 0.01$) for measure totals and for mean increase of each of the seven competencies and students' overall confidence score.

Of the 23 students who participated in the mid-term evaluation, three (13%) indicated, "We should spend more time covering material with the instructor and less time working in teams"; three (13%) indicated, "We should spend less time covering material in the class and have more time to work in our teams"; and 17 (74%) indicated, "There is a good balance between time we spend with the instructor covering material with us in class and time to work in our groups." It was reassuring to see that a substantial majority of students participating in the midterm evaluation process thought the flipped classroom approach to grappling with novel material struck a useful balance.

Qualitative Findings

Specific themes around teamwork, productive collaboration, and work quality emerged across student responses and throughout the semester.

TBL and Skill Development

All students provided feedback for one another using team contribution assessment rubrics; 19 also provided qualitative comments on the TBL and ePortfolio components of the course. Of the 19 commenters, 18 provided positive feedback (some also identified opportunities for improvement alongside the

positive feedback). The overwhelmingly positive data suggest the ePortfolio-heavy, TBL approach was accepted by students and provided a good learning experience for them. There was a strong focus in their comments on how teams worked together and the authentic work their teams produced in the ePortfolio. The word “work” and its various suffixes (ed/ing) was used 25 times in the 19 student comments. The adjective most used in the comments was “great,” which was used eight times in the 19 student comments, in statements like “great group to work with—thoughtful, innovative, and responsible.” These findings indicate the TBL approach in conjunction with the ePortfolio tool gave the students the opportunity to develop health education skills, build their ability to collaborate productively, and curate health education products in the ePortfolio tool.

The students identified communication and time management as important skills for team functioning. Some groups also noted room for improvement around these concepts. One example of an overall positive comment that identified an opportunity for improvement and recognized that skill development was taking place is,

Overall [team name] was a fun group to be a part of. We came together to combat a common health concern. Time management was a bit of an issue at times throughout the semester. This was a good learning process when working with others.

Only one student submitted negative feedback without positive components. The student’s comment focused on the mismatch in team members’ expectations, specifying that “the other members [of the team] just wanted to get their parts and do just that” versus embracing the collaborative process and additional resources the student offered.

At the beginning of the semester, students were concerned about the amount of group work inherent in the course and the challenge of learning the ePortfolio tool. By the end of the semester, their perspective had changed dramatically. Several students reported in conversation with their instructor that this course provided the best team experience they had ever participated in. This pattern also appeared in the end of semester team contribution assessments, with one student noting, “We got lucky as a group [and] worked really well together.” It was not luck though—this pattern is consistent with findings that TBL practices influence cooperative learning and teamwork skills among students (Persky, 2012).

Students valued the TBL experience and indicated that “working through the constructs in a real-life situation made them easier to understand.” Communication was a key identified factor of TBL and

students indicated the value of communication “forced us to align our thinking and understanding in a thorough manner, so as to present a coherent project” and “how to collaborate within a team and improve ideas by building off of each other’s strengths.”

Students reported that during the semester they developed skills around teamwork, communication with colleagues, leadership, creativity, planning interventions based on theoretical models, public speaking, and the ability to apply their learning to the practice of health education. One student stated that,

one of the most valuable things I gained from this semester is the ability to work efficiently [in] a group. I know that these team-based exercises have helped me develop group work strengths that I can use in future employment and life in general.

The collaboration and technology skills students honed in this class are applicable to real-life workplace environments, as “you have to adjust to individuals’ personalities and work ethic/style, and make it work,” and students can draw those connections as they completed their coursework.

ePortfolio

Student feedback on the inclusion of ePortfolio tools in the course was positive. Students expressed verbally that there was a steep learning curve to the tool initially, but by the end of the semester they “love[d] using eWolf as a health education page” and found that “managing information in such a manner that you can provide a clear, concise, and believable intervention outline/plan” made for a transformational learning experience.

Discussion

Quantitative analyses showed a statistically significant increase in students’ minimum and mean scores for each of the seven health educator competencies and the competency scale overall. Student’s confidence seeking work as health educators also increased substantially, indicating that the authentic, TBL course design successfully contributed to student learning and engagement.

Qualitative analyses provided additional information on how the course redesign served student needs. Students’ overwhelmingly positive feedback at the end of the semester supported the hypothesis that the TBL approach utilizing ePortfolio technology was accepted by students and provided a good learning experience for them. There was a strong focus in the students’ comments on how well the teams worked together and the high quality of work their teams produced and archived using ePortfolio.

Students' feedback supported the idea that the TBL approach using ePortfolio tools to collaborate and showcase health education products was accepted by students and provided a good learning experience for them. There was a strong focus in the students' comments on how well their teams functioned and the high quality of work their teams produced and archived using ePortfolio technology. Students identified the TBL components of the course as distinct and unusual but did not identify the use of ePortfolio—which was less common in the program's classes—as unique. Instead, the students accepted the ePortfolio as the course learning management system and a foundational tool: its use was so “baked into” the course, that students did not even notice it. This suggests that well-integrated ePortfolio tools are readily accepted by students.

Using the ePortfolio as a tool for TBL clearly demonstrated student group efforts. One student shared, “As much as I wanted things to just get done, I found that it was okay to let off the gas. This allowed for other strengths to shine through and allowed me to see who was actually contributing.” The ePortfolio helped students have a better visualization of what efforts were being done by the team as a whole throughout the semester, giving students the opportunity to really learn the value of what it means to work as a team without taking on more than necessary.

The findings from this inquiry highlight students' acceptance of a well-integrated ePortfolio tool as a course requirement and the utility of ePortfolio as a shared, collaborative workspace to support TBL. The Health Education instructor was pleased by the quality of student work and degree of ownership students displayed around their health education interventions. Students demonstrated significant learning and engagement with course material; and the ePortfolios contained such rich artifacts that they have since been incorporated as part of the program's annual assessment activities.

Conclusion

Students enjoyed this course and were proud of the work demonstrated in their presentations and ePortfolios. The course relied on two high impact practices: TBL and use of ePortfolio. This inquiry suggests that the redesigned Health Education: Theory and Practice course incorporating authentic learning activities substantially improved students' perceived efficacy and confidence in their ability to seek work and perform the job of health educators. Students in the class reported positive experiences collaborating with others to create health education interventions and indicated their learning experience supported teaching Health Education as an experiential, TBL course using ePortfolio tools. Based on these findings, the instructor from this pilot and the department as a

whole committed to expanding the use of TBL and ePortfolios in the health sciences classroom and encouraging others educating future health education and promotion practitioners to incorporate these practices when possible.

Health sciences faculty members were impressed and delighted by the depth of authentic student learning, as demonstrated through performance on assignments. The grade range was slimmer and skewed higher than in other upper-division courses and no students failed to pass or to succeed in the course. Overall, students in the TBL-framed, ePortfolio-using course earned better grades, relative to other courses the instructor taught, by doing more and richer work than was required in those other classes. In addition, the ePortfolios produced by the teams were impressive in their breadth and depth. The Division of Population Health Sciences has since revised the undergraduate program's annual assessment process to incorporate these artifacts of authentic learning as evidentiary support of student accomplishment toward the program's student learning outcomes, including the outcomes that “graduates of the BSHS Health Educator track will be able to: plan effective health education programs . . . [and] act as a resource person in health education” (UAA, 2020, para. 1; Crowell & Caladmidas, 2016). Building on this new course design in later semesters, the instructor worked with academic technology staff to develop a Health Education course ePortfolio template based on the work of high achieving teams in the class. Since then, another instructor has taken over the course and continues to use the ePortfolio as a tool to support students' TBL experiences.

Strengths

The methods used in this project build on earlier work in the field and offer compelling evidence about the utility of TBL and ePortfolio in the health science field. This inquiry joins a small number of published TBL projects using a pre/post-test design ($N = 7$ in Haidet et al.'s 2014 meta-analysis), supporting more rigorous evaluation of a curriculum method many are currently employing. The mixed methods approach offered quantitative evidence of statistically significant changes in student confidence and health education competencies, and a qualitative rationale describing how students believed the course components scaffolded their learning.

Limitations

This effort focused largely on students' confidence as future health educators and acceptance of TBL as a pedagogical framework, which limited the ePortfolio-specific data collected. While the methods used for the inquiry are consistent with other research in this area,

this study suffered from range restriction in the modified GSE scale and the lack of a comparison group. It is likely that any health education and promotion course—using TBL and ePortfolio tools or not—would have impacted students' self-reported competence and confidence as health educators. Evidence suggests that the authentic course design choices contributed to a larger increase than a traditional course would have; however, additional work with larger sample sizes and control groups for comparison is needed to show the difference.

Future Directions

The combined use of TBL and ePortfolio offers significant pedagogical promise both within and beyond the health sciences field. Bringing these two high impact educational practices together provides students with opportunities to build collaboration skills and solve real world problems, while simultaneously creating artifacts that persist past the end of the course.

Future research around this topic would benefit from larger sample sizes, systematic data collection around students' perceptions of ePortfolio as a tool to support learning, and comparisons of student performance in courses using ePortfolio with those utilizing other high impact educational practices. In addition, future research on student competence and confidence would benefit from incorporating other, less range-restricted measures and a pre/post/then framework, incorporating a retrospective pre-test, to improve on the pre- and post-test design utilized here.

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