

Retaining Teachers Through Building Confidence in Collaboration Skills: Promoting 21st-Century Teaching Skills in Teacher Education

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Abstract

In 2023, the United States faces a monumental teacher shortage. Murdock (2022) has quoted an estimated 36,504 full-time teaching positions as unfilled, with another 163,650 positions filled by underqualified individuals or by those teaching outside of their field of study. Although this figure falls short of the 53 percent of all schools reported by the National Education Association (NEA) as understaffed, it is a figure of consequence for educators and schools (Walker, 2022). The NEA has also reported that 55 percent of those in teaching and in educational support positions have considered leaving the profession earlier than planned. In 2018, the Organization for Economic Co-operation and Development (OECD) conducted their Teaching and Learning International Survey (TALIS) and found similar results. In the survey, 14 percent of teachers aged 50 years or younger stated their desire to leave the profession within the next five years.

Keywords: teacher education, teacher retention, collaboration, special education, classroom support

1. Introduction

Teacher shortages have been documented for over a decade, with enrollment in teacher education programs dropping, teacher attrition rates climbing, and the pandemic exacerbating multiple issues, including early retirements. Researchers have investigated how to protect the stability of the workforce in education by seeking ways to address issues voiced by teachers, such as causes of burnout and other reasons for leaving the profession. When OECD-TALIS (2018) asked teachers to comment on how to address workplace issues, teachers expressed the overall need for more training to increase competencies required for the 21st-century classroom to include creativity, critical thinking, communication, and collaboration. Urbani et al. (2017) posit that while much research focuses on the benefits and application of 21st-century classroom skills, few studies address how to build or facilitate these skills with preservice teachers.

This study fills a gap in teacher education research by targeting teacher candidates' confidence in peer collaboration as a specific activity to build these necessary skills. The study design used a pre-post survey to measure gains in confidence in collaboration skills between preservice early childhood education teachers and preservice special education teachers after engaging in a learning activity. In measuring the effectiveness of the intervention, this study included a control group to control for time spent in the college classroom.

Collaboration Skills and the 21st-Century Classroom

Collaboration can be framed as both a professional and personal skill within teacher dispositions. Bandura (1997) theories regarding self-efficacy necessary to build mastery are illustrative as confidence in using collaboration skills is germane to employing collaboration skills. Building collaboration skills in teacher preparation programs has become a critical aspect of addressing the needs of the 21st-century classroom.

Voltonen et al. (2021) have discussed the perception of teacher candidates regarding the 21st-century skills and dispositions needed within the classroom, citing collaboration as a critical skill to be acquired by 21st-century learners. Hamilton-Jones et al. (2014) have described the classrooms of the 21st century as epicenters of collaboration, identifying this skill as necessary to teacher candidates' personal and professional development (Urbani et al., 2017).

Collaboration as a Professional Skill

Hamilton-Jones et al., 2014 defined professional collaboration as two or more equally certified professionals partnering in teaching, decision-making, and goal-setting as well as in evaluating shared outcomes (Hamilton-Jones et al., 2014).

Additionally important to this definition, Hargreaves (2019) has stressed, are the quality and quantity of the collaboration within the professional collaboration. Da Fonte et al. (2017) have asserted that time and passion can account for the quality and quality of collaborative efforts. In addition to time and passion, training and preparation are necessary for future success in collaboration.

National professional education groups discuss collaboration as part of their standards and competencies for educators. The National Association for the Education of Young Children, in their 2019 *Professional Standards and Competencies for Early Childhood Educators*, posited early childhood education as a collaborative profession. The Council for Exceptional Children Standards (2020) has explicitly considered the issue of professional collaboration, in their Standard 7, which states that beginning special education professionals collaborate with families, other educators, related service providers, individuals with exceptionalities, and personnel from community agencies in culturally responsive ways to address the needs of individuals with exceptionalities across a range of learning experiences

Discussing the 30 years of evolution of research in collaboration, Hargreaves (2019) posited that a strong collaborative community within a school can add resilience in the face of an adverse policy environment such as more demands, fewer resources, and greater oversight by administration, parents or guardians, and other stakeholders. OECD-TALIS (2018) found that collaboration can provide a support mechanism for educators. In reporting on results regarding job satisfaction, OECD-TALIS grouped the responses into five categories. Among those five, a collaborative culture among teachers provided the respondents with a level of professionalism that enhanced job satisfaction. Specifically, 61 percent of collaborative efforts focused on the development of particular skills to improve student outcomes. Another 47 percent of the time, collaboration was devoted to exchanging teaching materials. These outcomes prompted the researchers to add collaboration as a goal for future practices.

Collaboration as a Personal Skill

Researchers have suggested that fostering a culture of collaboration allows teachers to learn from one another and improve their practices (Reeves, 2017). Additionally, researchers have identified this culture as a strong predictor of job satisfaction (OECD-TALIS, 2018), as a means of addressing changes in education (Hargreaves, 2019), and as a means of strengthening the workforce (CEC, 2021). Advocates for collaborative practice recommend that opportunities for teacher candidates and teacher practitioners must be early, intentional (CEC 2021), and underlined by diligence, effort, and training (Da Fonte et al., 2017).

Two findings of OECD-TALIS (2018) have further supported the value of training preservice teachers to implement collaboration in the workplace. First, OECD-TALIS has proposed that collaborative efforts prompt more cognitive-activation practices within the classroom. In addition to supporting best practices, collaboration is also connected to job satisfaction and teacher self-efficacy, benefits that additional research supports (Zakariya, 2020; Turker et al., 2022).

Although all teachers possess the ability to collaborate, their disposition toward this practice will determine their actual engagement within the educational workforce (Valtonen, 2021). Teacher preparation programs are often cited as failing to adequately prepare future teachers to engage in collaborative practices within the school setting, as typical guidelines for programs approach collaboration as a standalone course (Hamilton-Jones et al., 2014). Urbani et al. (2017) investigated preservice teachers' perceptions of their competence in 21st-century skills, including collaborative practices, while calling attention to the scarcity of research in how to explicitly facilitate these skills in teacher candidates. Results of their work focused on suggested practices for teacher education programs to create opportunities for preservice teachers across various programs to engage in learning opportunities together.

The Role of Self-Efficacy in Collaboration

Self-efficacy reflects confidence in one's ability to shape goals and actions by exerting control over environments or by impacting individuals' behavior. Zagona et al. (2017) found that special education teacher candidates possess greater self-efficacy in collaborating compared with general education teacher candidates. In investigating the irregularity between candidates in each preparation program, Zagona et al. (2017) focused on relationships between university coursework and findings on self-efficacy in collaboration skills, finding no relationship between coursework focused on collaboration and the feelings of preparedness to collaborate in professional collaborations. . Valtonen et al (2021) investigated the changes in teacher candidates' feelings regarding collaboration throughout their four-year preparation program, finding no significant growth. Proponents of reform in teacher education preparation programs advocate for programs to concentrate on coursework centered on building stronger collaboration skills, as well as for higher education faculty to dedicate more attention to these skills (Fonte et al., 2017; Hamilton-Jones et al., 2014; Gauvai, 2018; Grasser et al., 2017).

Montgomery et al. (2014), in examining the connection between teacher candidates' self-efficacy in collaboration and their beliefs about inclusion, found that a stronger belief in one's ability to utilize collaboration in the classroom predicted a more positive view of inclusion. Ajuwon et al. (2011) discovered that a self-evaluation of being ready to implement a practice such as inclusion may positively influence one's attitudes toward that practice. The global movement toward inclusion of K-12 students with diverse needs has intensified the need to focus on the skills underlying effective collaboration in the classroom (Hamilton-Jones et al., 2014; Da Fonte et al., 2017).

Exploring Collaboration in Teacher Preparation

Teacher educators operating within multiple programs, such as early childhood and special education preparation, can take advantage of their cross-disciplinary role to benefit teacher candidates. Linking students "across-courses" can spur collaboration among emerging professionals through skill-building activities that mirror collaboration in the learning and classroom environment. Teacher practitioners must often seek out opportunities to collaborate, as they are not physically in the same room. Requiring partners in different courses to use technology (such as Google Docs, Teams, or Zoom) can increase the activity's resemblance to collaboration in a professional setting.

Fogo et al. (2019) trialed this strategy, devising an intervention to examine collaboration between general education and special education teachers facilitated via technology. The researchers began the investigation by assigning activities that prompted meaningful collaboration—opportunities that, according to Fogo et al., are limited within teacher education programs and school districts. Overcoming barriers such as space and time constraints, the authors) constructed a workshop format to discuss social studies content in the context of inclusive practices for specified groups of learners. The teacher candidates were connected via synchronous online learning platforms.

The teacher candidates were asked to jointly design a lesson plan, discussing objectives and Individual Education Plan (IEP) issues that included accommodations or modifications. Fogo et al. (2019) identified the teacher candidates' evaluation of the activity as overwhelmingly positive, with participants expressing more confidence in their ability to collaborate with other professionals.

Decades of research like the study outlined above have addressed issues related to collaboration within school systems and classrooms. The movement toward inclusive classrooms has increased the importance of this skill, as have the resounding results of various studies such as Hargreaves (2019) that link higher self-efficacy in collaboration to higher use of collaborative practices, higher job satisfaction, and higher retention of teacher practitioners. Missing from this conversation is research on how to structure teacher education programs to promote the development of purpose-driven collaboration skills (McKenzie, 2009).

This study fills a gap in teacher education research by using a specific activity to build one of these necessary skills, targeting preservice teachers' confidence in peer collaboration. The study design used a pre-post survey to measure gains in confidence in collaboration skills between preservice early childhood education teachers and preservice special education teachers after engaging in a learning activity. In measuring the effectiveness of the intervention, this study included a control group to control for time spent in the college classroom.

Purpose of the Study

Higher levels of confidence in multiple teaching skills, including in collaboration, are posited to enhance job satisfaction, which can help prevent attrition within the profession. Teacher educators must ask how teacher preparation programs can assist in building levels of confidence in collaboration that will ostensibly transfer to the working environment. The research question guiding this work is simple: Can a targeted assignment, designed around collaboration as a work product, act as a more impactful intervention to build teacher candidates' confidence in professional collaboration compared with traditional instructional strategies (partner work, group work) employed in the college classroom?

2. Methodology

This research paper adds to the growing body of work surrounding teacher collaboration, reflecting on both in-service and preservice teachers' perceptions of confidence within the Framework for Teaching (FFT) (Danielson, 2013). These dimensions and components include collaboration with other professionals and families.

Study Design

Referencing the FFT four dimensions, a survey was developed asking participants to rate their confidence within 15 elements organized under five components. The survey was constructed to include skills on which the study was focused as well as additional skills. The 58 participants in the study were students within two higher education institutions in the state of Ohio in three different programs of study, including teachers in general education and special education programs. The participants were asked to complete the same survey at two different points in time. The first survey was completed at the orientation for the courses. These orientation sessions were held on August 22, 23, and 24, 2023.

After the first survey was administered to students in each program of study, an ANOVA evaluated how these three groups might differ in their initial responses. Although the study's design used the gain scores from the pre- and post-surveys for the control and treatment group, the analysis of the variance within the three programs' participants adds some context and comparisons to the pre-responses to the survey.

The three groups became the control and treatment groups, and the means of the pre-intervention survey for each of the categories and elements were analyzed. The post-survey was administered after 11 weeks, and the responses were calculated for the control and treatment groups. The research question was answered through the analysis and comparison of the gain scores in confidence for the 15 elements for both groups.

Participants

Table 1 displays the demographics of the participants and the grouping. The three courses

Table 1. Demographics of control and treatment group

Group	N	M/F	Age Range	Year in Program
Control	17	1/16	20-25	2
Treatment	41	6/35	20-34	2-3

were divided into two groups, treatment and control. The treatment group consisted of 20 teacher candidates in general education enrolled in preschool to Grade 3 social studies and science course and 21 teacher candidates in special education enrolled in assessment in a special education course. The control group consisted of 17 teacher candidates in general education enrolled in a preschool to Grade 3 curriculum course. The post-survey was completed 11 weeks later on November 14, 15, and 16.

Developing the Survey

Utilizing a Likert-type rating scale 1–10, this research used 15 (elements) in the form of questions to analyze feelings of confidence in five categories based on Danielson's Framework for Teaching (2013):

Category 1: Curriculum Development and Implementation

- E1 Planning a curriculum to meet state standards
- E2 Understanding the concepts that are required to be taught at one's school
- E3 Teaching the concepts to the students in one's classroom

Category 2: Classroom Organization and Management

- E4 Establishing classroom management and guidance systems
- E5 Establishing routines and obligations within the classroom
- E6 Managing children's typical and atypical behavior

Category 3: Collaboration with Professionals

- E7 Accommodating individual children
- E8 Adhering to the requirements of an IEP in working with others
- E9 Collaborating with other teachers

Category 4: Working with and Communicating with Parents

- E10 Communicating on a regular basis with parents/guardians
- E11 Addressing concerns and/or comments regarding curriculum or instructional practices
- E12 Keeping parents/guardians informed of the classroom activities

Category 5: Demands of the Profession

- E13 Everyday demands of the profession pedagogical knowledge
- E14 Being on time and being prepared: every day, every subject
- E15 Being observed and evaluated: daily, weekly, monthly, yearly

Piloting the Survey

A pilot test was conducted with 15 teacher candidates (five early childhood education teacher and 10 special education teachers), equaling approximately 26 percent of the respondents. The pilot was administered to ensure the categories and

the elements were clear for the participants, although the pilot group did not include any member of the treatment or control group. Ary et al. (2018) have suggested using a pilot sample of at least 10percent to refine survey questions. In completing the pilot, four questions were added, and to capture attitudes and beliefs even further, an open-ended question was added: “Do you think challenges have changed for teachers in the last two years? If so, how?”

Administering the Survey and Pre-intervention Results

All participants were given the five-category, 15-item survey with the following instructions at the top:

Please rate the following areas of teacher competencies in terms of your feelings of confidence in a classroom and school setting. A rating of “1” would indicate that you feel no level of confidence, and a rating of “10” would indicate the highest level of confidence.

Participation was voluntary. There was no time limit, and participants could complete all or some portions of the survey at their discretion. With the five categories of the survey acting as topics for the 15 questions, the survey was distributed to each of groups, the open-ended allowed participants to add context if they choose to do so.

To analyze the internal consistency, or the reliability, of the survey, Cronbach's alpha coefficient was calculated, as this statistic helps determine whether a collection of items consistently measures the same characteristic (Ary et al., 2019). Cronbach's alpha (α) coefficient for the treatment group was calculated at 0.92, and for the control group, $\alpha = 0.94$. The groups' combined $\alpha = .95$. The score of .80 on Cronbach's alpha represents good internal consistency, and scores of .90 and above signify excellent internal consistency (Ary et al., 2019).

Table 2 displays the means for the control and treatment group calculated for each of the dimensions and survey questions and are presented for comparison. The outcome of this analysis revealed that the groups were alike in many ways and differed in others. The two groups differed in their confidence in all questions regarding curriculum development and implementation as well as classroom organization and management (Questions 1 through 6). The groups were similar in their responses to the remaining questions in the categories of working and communicating with parents and meeting the demands of the profession, except for Questions 8 (“adhering to the requirements of an IEP in working with others”) and 10 (“communicating on a regular basis with parents or guardians”).

Table 2. Pre-Survey Results for Three Groups of Participants and Analysis of Variance in the 5 Categories of Teaching and 15 Elements

	Control (n=17)		Treatment (41)		ANOVA	
	Mean	SD	Mean	SD	F-Value	P-value
Category 1	5	2.59	6.93	1.78	9.19	<0.00*
question 1	4	2.47	6.83	1.87	11.26	<0.00*
question 2	5.59	2.65	7.4	1.71	5.25	0.00*
question 3	5.41	2.65	7.7	1.77	7.26	<0.00*
Category 2	5.78	2.71	7.67	1.81	6.02	0.00*
question 4	5.35	2.83	7.73	1.84	7.28	<0.00*
question 5	6.24	2.86	8.18	1.81	4.88	0.01*
question 6	5.76	2.44	7.05	1.88	3.59	0.03*
Category 3	5.39	2.8	6.73	2.21	3.08	0.06
question 7	5.53	2.74	6.53	2.12	2.07	0.14
question 8	4.94	2.75	6.88	2.34	4.18	0.02*
question 9	5.71	2.91	6.78	2.17	1.94	0.15
Category 4	6.45	1.98	7.5	1.96	3.86	0.03*
question 10	6.47	2.74	7.65	2.07	4.06	0.02*
question 11	5.76	2.54	6.75	2.05	3.05	0.6
question 12	7.12	2.55	8.12	1.75	2.84	0.1
Category 5	6.92	2.7	7.47	1.8	0.68	0.51
question 13	5.82	2.88	6.25	1.84	0.23	0.8
question 14	7.88	2.34	8.68	1.67	1.12	0.33
question 15	7.06	2.88	7.48	1.89	0.89	0.42

*Significant at 0.05

In Category 3, “Collaborating with Professionals,” the ANOVA revealed no significant differences in the groups prior to the intervention. Questions 7, 8, and 9 are those posed on the pre-survey and are used to evaluate growth in confidence in collaboration when analyzing gain or loss scores in the post survey. On Questions 7 and 9, the variance within the

responses between the two groups within the pre-survey did not vary significantly. On Question 8, (“adhering to the requirements of an IEP in working with others”) the initial survey responses between the two groups varied significantly.

Design of Intervention

In designing an intervention, the instructor introduced a “case study” assignment for students within a special education course and a general education course (See Appendix 1). Using case studies or teaching cases is an effective instructional strategy for teacher educators (Bezanilla et al., 2019). In this case study project, the instructor used an across-course collaboration, which would join a special education teacher candidate with a general education teacher candidate and assign this team the case study project.

The course within the early childhood education program focused on social science and science curriculum for students in pre-K through Grade 3. The course within the special education program focused on assessments in special education. The case study project would require the team to analyze the case study using a hypothetical battery of tests and psychological analyses and then plan two activities based in general education and in special education. The first comprised a social science lesson plan attending to the hypothetical student’s needs, and the second identified and provided a rationalization for further assessments to be administered.

Evaluations of the projects would include their reflections on the shared belief system regarding the mutual benefits of building collaborative relationships with other professionals. This assignment differed from others within the courses, as the requirements for completing the assignment 1) differed for each partner, 2) simulated the work environment in which teachers often have differing responsibilities but are jointly focused on helping one student, and 3) focused on both the *product* of collaboration and the *process* of the collaboration.

The product of collaboration was exemplified in the teacher candidate within the special education course being required to identify additional assessment tools that might be needed to further investigate the needs of the student, as well as the general education teacher’s role in gathering data needed. The general education teacher candidate’s role was to ask questions of the special education teacher candidate that would be necessary to design a lesson plan accommodating the needs of the student. The product of the collaboration was in designing the lesson plan.

The process of collaboration was demonstrated by the requirement of documenting the information exchanged between the general education teacher candidate and the special education teacher candidate, which included four components:

- 1) Additional information that either would want to seek
- 2) Suggestions for gathering additional information
- 3) Accommodations for the student that might be necessary based on the information within the case study
- 4) Assistance that the special education teacher candidate might need from the general education teacher in gathering information to complete the profile of needs

To complete the assignment, an additional element of the process of collaboration would need to be resolved, much like collaboration within a professional environment. The teacher candidates would need to plan for the physical location of each of the partners. They would need to contact their partner and agree on the conditions of collaboration, such as the method, the meeting time, and the mutual responsibility to use technology such as Zoom, Teams, and Google Documents.

Both the treatment group and the control group met for 10 sessions within the 11 weeks. For each of the groups, 10 of the four sessions included group work (three or four students), and six utilized partner work. Three key elements summarize the differences between the members of treatment group and the members of the control group: makeup of partner work, components of assignments, and requirements of each member.

The control group worked with partners within the same course, while the treatment group involved partners in two different courses. The control group had easy access to their partner, as they were physically in the same room at the same time. They did not need to utilize technology or preplanning skills to meet and discuss their work.

Another difference between the treatment and the control group lies in the assignment. Within the control group, the work focused on individual assignments, which required the same content and background information from each member. In contrast, because the treatment group worked with a partner outside of their specific course of study, each participant—the general education teacher candidate and the special education teacher candidate—was individually responsible for the elements of the collaboration that pertained to their individual work requirements. Therefore, the collaboration served as a vehicle for the completion of each teacher candidate’s required assignment, but the assignment still required the individual to complete an individual element to the work.

As a final difference, the control group partners had the same information about the same assignment, making a collaboration on the activity relevant to the *product*. The treatment group had differing information regarding the requirements of their respective assignments, making collaboration necessary for both the *process* and the *product*.

Administering the Post-Survey to the Treatment and Control Groups

At the conclusion of the 11 weeks, the participants were asked to complete a second copy of the survey. During the 11 weeks, some attrition from both groups accounted for the number of participants decreasing. The treatment group contained 39 paired surveys, and the control group contained 15 paired survey responses. The time lapse also aided in eliciting authentic confidence scores (whether their self-efficacy had increased, decreased, or remained identical), as the participants had forgotten their original markings.

3. Results

Cronbach's alpha (α) coefficient, used to determine the level of internal consistency for the post survey for the treatment group, was calculated at 0.91. For the control group, $\alpha = 0.95$. The groups' combined $\alpha = .92$. With this information gathered, a paired sample *t*-test was used to analyze the pre-post scores for the treatment group and the control group. Cohen's *d* was used to compare the magnitude of the difference between the pre-post analysis, which showed a statistically significant difference, illustrating the impact of the treatment. Effect sizes are categorized into three groupings: 0.21–0.49 as small, 0.51–0.79 as medium, and 0.8 and greater as large.

Table 3 contains multiple analysis for each question. The results of this analysis are noteworthy. Within the 15 elements, both groups shared some growth in confidence, with some overlap of gains in confidence between the groups within the categories except for Questions 7, 8, and 9. In answering the research question guiding this work ("Can a targeted assignment, compared with traditional instructional strategies [such partner work or group work] more effectively help teacher candidates build confidence in collaboration skills?"), the results indicate that the intervention was significantly successful.

Table 3. Results of Pre- and Post-Paired Sample T-tests and Cohen's *d* for Treatment and Control

Question	Treatment Group				Control Group			
	<i>n</i>	<i>t</i> -value	<i>p</i> -value	Cohen's <i>d</i>	<i>n</i>	<i>t</i> -value	<i>p</i> -value	Cohen's <i>d</i>
Q 1	39	2.49	0.02*	0.42	15	3.42	0.00**	0.85
Q 2	39	1.84	0.07		15	4.02	0.00**	1
Q3	39	1.92	0.06		15	3.66	0.02*	0.69
Q 4	39	1.17	0.25		15	3.64	0.00**	0.91
Q 5	39	0.1	0.93		15	3.69	0.00**	0.92
Q 6	39	0.82	0.42		15	3.37	0.00**	0.84
Q 7	39	6.11	0.00**	0.99	15	0.72	0.49	
Q 8	39	4.29	0.00**	0.7	15	0.61	0.55	
Q 9	39	7.10	0.00**	1.12	15	0.74	0.47	
Q 10	39	3.02	0.00**	0.47	15	2.69	0.02*	0.67
Q 11	39	4.68	0.00**	0.76	15	3.03	0.01**	0.76
Q 12	39	2.83	0.01**	0.44	15	3.3	0.01**	0.82
Q 13	39	4.73	0.00**	1.83	15	3.32	0.01**	0.83
Q 14	39	1.9	0.7		15	2.85	0.01*	0.71
Q 15	39	1.130	0.27		15	3.34	0.00**	0.83

*Significant at 0.05

**Significant at 0.01

The treatment group recorded statistically significant gains within the questions targeted to measure the participants' confidence in collaborating with other professionals. The control group showed gains in confidence in every other area except those measuring confidence in collaboration skills.

Discussion and Implications for Instruction

The results of the analysis of the pre- and post-scores for the control group and the treatment group reveal a notable difference. If both the treatment and control group had reported growth in the questions measuring confidence in collaborating, the group work and partner work, which were included in both courses, might have provided an understanding for how this growth occurred. However, this did not happen. After all, teacher educators often include partner work and group work to foster collaboration skills. In addition to including group work in teacher education courses, instructors often describe and comment positively on collaborating with others in the profession.

The control group had received the same information regarding the importance of collaboration; however, without a targeted assignment aimed at the product and process of collaboration, their second survey measured confidence in collaboration hypothetically. In contrast, the treatment group had completed an assignment that developed and demonstrated their collaboration skills, so their second survey measured a more concrete notion of confidence in collaboration. The treatment group was able to gauge their efforts in a meaningful way in terms of an activity they had finished whereas the control group was judging their confidence in applying a concept they believed would be important in their future work.

As part of the case study project, teacher candidates within the treatment group were asked to comment on the process of collaborating. Many reported on the obstacles, which included finding similar times and using technology to meet, developing an understanding of the work within the partnership, and establishing a working relationship. However, multiple participants additionally expressed an appreciation for working through the obstacles and completing the assignment.

The results of the pre-post analysis of the treatment group illustrate why teacher educators should design activities in which teacher candidates can build confidence in collaborative partnerships with others. The case study project was meant to promote the process and the product of collaboration and relied on active involvement from both learners.

4. Limitations

As with any research limited to a group of teacher candidates in universities within one state, the results should be viewed as information to be used in pursuit of best practices. This targeted intervention was used with teacher candidates in their junior year whose teacher dispositions were still forming. It is also possible that this impact was influenced by the willingness of the instructor to discuss the need for collaboration. There was no gain score for the control group though as both the control and treatment group had the same instructor.

Another limitation derives from the interpretation of an effect size, or the power statistic Cohen's *d*, used in this case to qualify the gain scores on the survey, which are based on teacher candidates' feelings. Although the analysis included a control group to control for the variable of time (11 weeks), the number of participants included with two surveys, and the content and instruction, additional extraneous variables always arise when working with 58 students between two groups. These variables could range from other instructors expressing viewpoints on collaboration to the teacher candidates experiencing collaboration within their field experiences in a positive or negative way.

5. Conclusion

To review a previously offered definition, professional collaboration refers to two or more equally certified professionals partnering in teaching, decision-making, and goal setting, as well as in evaluating shared outcomes (Hamilton-Jones et al., 2014). Both Hargreaves (2019) and Da Fonte et al. (2017) have stressed the quality and quantity of collaboration efforts as important to future success. National professional education groups such as The National Association for the Education of Young Children and the Council for Exceptional Children's Standards identify collaboration as part of their professional standards.

The movement towards inclusive classrooms has increased the need for professional educators to collaborate when working with individual students. Multiple studies link a higher level of confidence in collaboration to issues in job satisfaction including those leading to higher retention. Collaboration can provide a support mechanism for educators (OECD-TALIS, 2018), address the ongoing changes in education (Hargreaves, 2019), and strengthen the workforce (CEC, 2021). Many teacher education programs include coursework and standalone courses that focus on collaboration in the classroom, in the profession, and with families. These courses can act as the focal point of programs, or they can lack meaningful content. Often, teacher educators use work groups to build collaboration skills within the delivery of a course. The pre-post analysis of the control groups' results demonstrates that using typical activities such as partner and group work within the college classroom can develop confidence in many areas of teaching. However, without a targeted assignment or activity, group work may not impact the level of confidence in collaboration, as demonstrated through the analysis of the pre- and post-survey for the control group.

The outcome of this research seems to mimic the outcome of Fogo et al. (2020), whose outcomes were similar in the teacher candidates' reactions and a gain in confidence in their ability to collaborate with other professionals. The results of this research confirmed the same outcome: a positive impact, measured via pre-post analysis, on teacher candidates' confidence in collaboration with other professionals.

Teacher educators are constantly and often enthusiastically in search of ways to retain teacher candidates, to improve the quality of interactions among emerging professionals, to prepare teacher candidates for the work that lies ahead of them, and to improve the quality of education for all students within the candidates' future classroom. It is incumbent upon all within the higher education system to seek methods and activities that equip the future teachers with skills that will support them in the field. This research indicates that using targeted activities can enhance levels of confidence in collaboration for soon-to-be teacher practitioners as they transition to the K-12 classroom.

Teacher candidates rely on preparation programs to learn the skills and dispositions that will be necessary not only to survive in the 21st century classroom, but also to thrive. Teachers who learn how to work collaboratively can extend this effort to teaching students within their classroom how to work together. This activity allowed the teacher candidates to understand collaboration as a process, a mindset, and a practice that is useful to professional goals. In other words, collaboration for the teacher candidates became abstract and concrete, both a noun and a verb.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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