Paired Placement Internships: Clinical Teaching Becomes a Collaborative and Empowering Model for Ongoing Professional Development

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Abstract

The paired placement model for clinical teaching places two teacher candidates with one mentor teacher (Leatham & Peterson, 2010). This clinical teaching model has encouraged collaboration, pedagogical risk-taking, increased reflection, and better classroom management (Mau, 2013). Members of the Mathematics Teacher Education Partnership’s (MTE-Partnership) Clinical Experiences Research Action Cluster (CERAC) have formed a sub-RAC called Paired Placement, which has implemented the paired placement model across multiple institutions for five years and have used Plan-Do-Study-Act (PDSA) Cycles to collect data before, during, and after the clinical teaching experience. The PDSA Cycle incorporates data from structured and unstructured interviews, surveys, teaching evaluations, reflective journals, and focus groups. Secondary mathematics teacher candidates who were enrolled in university-based teacher preparation programs, their mentor teachers, and their university supervisors participated in the PDSA Cycles. In this report, members from the Paired Placement sub-RAC share results from individual PDSA Cycles. Results describe the progress of each institution in their use of the paired placement instruments and various implementation protocols.

Overview

Clinical experiences are opportunities for teacher candidates to enact what they have learned in coursework via teaching, observing, and collaborating with effective mentor teachers. Furthermore, clinical experiences have been cited as more influential on long-term teaching practices than program coursework (Wilson, Floden, & Ferrini-Mundy, 2001). Moreover, the 2017 Association of Mathematics Teacher Educators’ Standards for Preparing Teachers of Mathematics (AMTE Standards) state:

An effective mathematics teacher preparation program includes clinical experiences that are guided on the basis of a shared vision of high-quality mathematics instruction and have sufficient support structures and personnel to provide coherent, developmentally appropriate opportunities for candidates to teach and to learn from their own teaching and the teaching of others. (p. 26)

The Clinical Experience Research Action Cluster (CERAC) of the Mathematics Teacher Education Partnership (MTE-Partnership), a subsidiary of the Association of Public and Land-grant Universities (APLU), is one group that has taken on the challenge of transforming secondary mathematics teacher candidates’ field/clinical experiences. The MTE-Partnership is a consortium of over 104 U.S. universities and colleges, along with partner school districts, focused on improving the initial preparation of secondary mathematics teachers. The MTE-Partnership uses a networked improvement community (NIC) design that incorporates improvement cycles to
develop adaptable interventions across contexts to support comprehensive program improvement (Martin & Gobstein, 2015). Rather than addressing a single dimension of a secondary mathematics program, the MTE-Partnership is undertaking parallel lines of research in multiple areas. The CERAC consists of representatives of 26 university-led teams that have employed improvement science methods to develop resources that support improved models for both student teaching and early field experiences, as well as professional development for mentor teachers. In order to support the AMTE Standards, as stated previously, the CERAC focuses on a problem that is two-fold:

1. There is an inadequate supply of quality mentor teachers to oversee clinical experiences. Too few teachers are well-versed in implementing the Common Core State Standards for Mathematics (CCSS-M) and other college- and career-ready standards, and teachers are especially inexperienced with embedding the Standards for Mathematical Practice into their teaching of content standards (National Governors Association & the Council of Chief State School Officers, 2010.)

2. Bidirectional relationships between the teacher preparation programs and school partners in which clinical experiences take place are rare. Such relationships that reflect a common vision and shared commitment to the vision of CCSS-M and other college- and career-ready standards, and other issues related to mathematics teaching and learning are critical to the development and mentoring of new teachers.

One of the sub-RACs of Clinical Experiences focuses on the paired placement model, which places two teacher candidates with one mentor teacher (Leatham & Peterson, 2010). This model has been credited as a model of learning to teach that encourages collaboration, pedagogical risk-taking, increased reflection, and better classroom management (Mau, 2013), and thus can serve as a mechanism for helping to address the problem of the quantity and quality of mentor teachers. Members of the Paired Placement sub-RAC have implemented the paired placement model across multiple institutions for five years and have used PDSA Cycles (Bryk, Gomez, Grunow, & LeMahieu, 2015) to collect data before, during, and after the clinical teaching experience to improve the implementation of the model and to monitor the model’s effectiveness. The PDSA Cycles incorporate data from structured and unstructured interviews, surveys, teaching evaluations, reflective journals, and focus groups.

In these five years, a number of different PDSA Cycles were used to refine and improve the effectiveness of the paired placement model. For example, a combined workshop/orientation meeting among the mentors, teacher candidates, and university supervisors at the beginning of the placement were not included in the original implementation of the model but were later added and refined to ensure each person involved in the collaboration understood their roles, responsibilities, and expectations, collectively. As a result of another PDSA Cycle, interview questions were developed for teacher candidates and later refined to include both mentor teachers and university supervisors in order for researchers to understand the effects of the paired placement model across the institutions.

Team members use these questions to help understand potential successes and obstacles of implementation across multiple contexts. These findings have been shared at annual MTE-Partnership conferences (2017, 2018) and at the 2017 National Council of Teachers of Mathematics (NCTM) Research Conference. Our partnerships across multiple institutions in the U.S. have allowed researchers to use PDSA Cycles to effectively enact the paired placement in ways that fit multiple contexts (Conway, Erickson, Parish, Strutchens, & Whitfield, 2017; Strutchens et al., 2019). Conway et al. (2017) provided a synthesis of the benefits and potential pitfalls of the paired placement from multiple contexts. Conway et al. found that the paired placement model increased teacher candidates’ collaboration, sense of community, pedagogical risk-taking, reflective practice, and accountability. The model also decreased the number of cooperating teachers needed for placement in the field, which increased the quality of mentors in field placements (Conway et al., 2017). In 2019, Strutchens et al. described the
implementation of the paired placement and co-planning and co-teaching field experiences across multiple contexts. Furthermore, Strutchens et al. (2017) described the use of the PDSA Cycles in creating and revising the Mathematics Teacher Practices Survey, the Mathematics Classroom Observation Protocol for Practices (MCOP), and the Program Completer Survey. Teacher candidates across the different institutions also were asked to complete the Mathematics Teacher Practices Survey every two weeks, and the teacher candidates were observed by a project member using the MCOP developed by Gleason et al. (2017) at least twice throughout the semester.

This year, four institutions attempted to implement the paired placement model. In this report, members from the institutions share how they used one of the PDSA Cycles in their own institutional context. Researchers at Auburn University focused on how the university supervisor, mentor teachers, and two teacher candidates worked together; the Columbus State University research team examined observational tasks; and the researchers at the University of Hawai‘i at Manoa investigated the co-planning and co-teaching strategies used by their pairs.¹

Auburn University: Interviews and Focus Groups

The research (Leatham & Peterson, 2010; Mau, 2013; Peterson & Leatham, 2018; Strutchens et al., 2019) related to the paired placement model purports that the model enables teacher candidates to become student-centered, reflective, and more collaborative practitioners. Given these predicted attributes of the model, we used PDSA Cycles early and later during Spring 2019 to examine whether the teams composed of a mentor teacher, a pair of teacher candidates, and a university supervisor were working in a manner that would lead to the teacher candidates developing these traits. At Auburn University, we emailed the questions in Appendix A to the team members around Week 3 of student teaching. The team member emailed their responses to the project leaders; the project leaders then read the team members’ responses to determine how well the team was working toward the aforementioned attributes. Teacher candidates also were required to keep journals related to their growth as teachers throughout the semester, and their growth also was monitored and measured with Auburn University program assessments. Project leaders held a focus group with the team members at the end of the semester to determine the growth of the teacher candidates and the effectiveness of the paired placement model (see questions used in the focus group in Appendix B). Thus, several data sources were used to determine teacher candidates’ growth toward the aim of “during student teaching, teacher candidates will use each of the eight Mathematics Teaching Practices (NCTM, 2014) at least once a week during full time teaching” (Stutchens et al., 2017) and the predicted traits afforded by the paired placement model.

For this report, we focused on the PDSA Cycle that was given after two weeks of student teaching during Spring 2019 and the focus group that took place at the end of the student teaching experience during the same semester. Figure 1 contains the types of questions that were asked of each team member during the PDSA Cycle, and Figure 2 contains the types of questions that were asked during the focus group session.

<table>
<thead>
<tr>
<th>Question</th>
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<tr>
<td>1. How are the members of the team interacting?</td>
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<td>2. How are the students responding to team members?</td>
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<td>3. What is going well?</td>
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<tr>
<td>4. How can we better support you?</td>
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<tr>
<td>5. What are your strengths and weaknesses related to implementing equitable teaching practices?</td>
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<tr>
<td>6. At this point what do you see to be the benefits and challenges of the paired placement model?</td>
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Figure 1. PDSA Cycle focus on the veracity of the paired placement model.

¹ All names in the reports are pseudonyms.
1. What are attributes of the paired-placement model that contribute to successes in your current teaching practice?

2. What are attributes of the paired-placement model that contribute to challenges in your current teaching practice?

3. In what ways, if any, did the paired placement internship impact your working or collaborating with other teachers to support student learning?

4. In what ways did the paired placement internship impact your teaching practices? For example, did the emphasis on the mathematics teaching practices influence your own teaching of mathematics?

5. Did the paired placement internship encourage you to take more risks and try new teaching approaches in your mathematics classroom? If so, will you share an example?

6. What would you say are the components of the paired placement internship that positively impacted the interns’ teaching practices? What components could be added to the model to make it more effective for future candidates?

7. Have the interns contacted you about a time in their current teaching career where they felt the experiences in the paired placement internship impacted their actions?

8. Have you served as a mentor teacher in a 1-1 internship previously, if so, which model do you think best serves the interns? Explain.

Figure 2. Focus group interview questions related to the veracity of the paired placement model. Note that each member of the team was asked questions appropriate for his/her particular role during student teaching and beyond.

Findings from PDSA Cycle

Since we had two sets of paired placements for Spring 2019, we labeled them Team A and Team B.

Team A. The mentor teacher on Team A has been teaching since 2003. She has the following degrees in mathematics education: a Bachelor of Science, Master of Science and a Ph.D., as well as an Ed.S. certification in mathematics education. She also has attended several professional learning workshops held by faculty members at Auburn University and has served as a presenter at mathematics education workshops and conferences. Dr. Gold has hosted several traditional teacher candidates and three pairs prior to this semester. The teacher candidate pair placed with her were secondary mathematics education majors. Miss Bold can be described as caring, easygoing, and average academically. The other member of the teacher candidate pair, Miss Wells, can be described as intense, driven, caring, and above average academically. The university supervisor, Dr. Merit, is a senior professor of mathematics education who is well versed in inquiry-based instruction and current reforms in mathematics education. He also served as an instructor for the secondary mathematics teaching course and an integrating mathematics with technology course, which had practicum experiences attached to them. Miss Bold and Miss Wells were in the secondary mathematics teaching course the semester before their student teaching semester and did their practicum experiences with Dr. Gold. Placing the pair with Dr. Gold the semester before their student teaching semester enabled the pair to become familiar with Dr. Gold and her students the semester before, so that they could quickly ramp up into teaching during student teaching. Based on the PDSA Cycle and the focus group session, the four worked well together.
The major themes that emerged from Team A were collaboration focused on learner needs and support for the designated lead teacher. The PDSA Cycle that was given around the third week of the student teaching semester revealed that the team worked well together. Miss Bold stated the following about how the members of the team were working together:

Some things that are going well include being able to discuss ideas with Dr. Gold and Miss Wells, having more than one set of eyes monitoring the classroom at all times, and splitting up the daily duties. No one ever feels too overwhelmed because there is always someone else backing you up and helping out. If one of us forgets something, odds are that someone else remembered it and already took care of it. If a student gets too rowdy and needs to leave the classroom, there is still two other teachers in the room with everyone else.

Dr. Gold echoed the teamwork that took place among her and the teacher candidates:

There is an incredible amount of teamwork. When I have to discuss lesson plans or a classroom issue with one intern, the other is available to help students with tutoring, etc. We all contribute during lessons led by one intern by helping with seat work or effective questioning during group investigations. We spend time most days allowing each of the three of us to give feedback on the day’s events. One intern and I have acted as students to allow the other intern to practice a part of a lesson when unsure of how it may go. We also have the ability to pull kids into the hall and work one on one as needed as the other remains in charge of the class.

Miss Wells also agreed with Miss Bold’s and Dr. Gold’s assessment of how the three were interacting together. Dr. Merit also felt that they were working well together and were focused on meeting the needs of their students. The group’s comments at the end of the semester were very positive and reiterated that each of them valued having three teachers in the room who really wanted the students to succeed. Dr. Gold made the following statements about the paired placement model:

There is no comparison, and I doubt that I would accept a single intern again after participating in this model.

There is more time to collaborate about and perfect lessons before they are taught because there is always another teacher to help out as needed.

Students benefit from the extra help that is available when in a traditional internship, there is sometimes a decrease of one-to-one-interactions with the teacher because the teacher and intern need time to collaborate about lessons, etc. This takes away from the availability of the teacher.

Cooperating teachers are supposed to leave the interns alone for periods of time and thus cannot continuously give feedback when not observing but a second intern in the room can provide feedback in these cases.

Another set of eyes and another opinion or constructive criticism is helpful.

They learn from observing the strengths and weaknesses of each other.

Team B. The mentor teacher on Team B has been teaching for 13 years. She has a bachelor’s degree in elementary education and master’s degree in library media. She became a certified secondary mathematics
teacher through an alternative route. She also has attended several professional learning workshops held by faculty members at Auburn University and has served as a presenter at mathematics education workshops and conferences. Mrs. Jewel has hosted several traditional teacher candidates and one pair prior to this semester. The teacher candidate pair placed with her were secondary mathematics education majors. Mr. Winn can be described as caring, easygoing, and average academically. The other member of the teacher candidate pair, Miss Mack can be described as intense, driven, caring, and above average academically. The university supervisor, Dr. Weston, is a retired mathematics teacher educator who is well versed in inquiry-based instruction and current reforms in mathematics education. Dr. Weston has served as a supervisor for Auburn University for several years. Mr. Winn and Miss Mack were in the secondary mathematics teaching course the semester before their student teaching semester and did their practicum experiences with Mrs. Jewel. Placing the pair with Mrs. Jewel the semester before their student teaching semester, enabled the pair to become familiar with Mrs. Jewel and her students the semester before, so that they could quickly ramp up into teaching during student teaching. Based on the PDSA Cycle and the focus group session the four worked well together.

The major themes that emerged from the PDSA Cycle for Team B were collaborating around lesson planning and ensuring that all of their students felt challenged and supported. Mrs. Jewel stated the following about how they worked together early on in the semester:

The three of us are interacting very well. We are able to spend time co-planning, co-teaching, and evaluating our lessons. While one educator is leading the lesson, the other two are helping students. We seem to have common goals that lead us to effective planning, teaching, and assessing our students.

Mrs. Jewel also stated the following about their team:

A strength is in lesson planning. Our schedule includes two inclusion classrooms. The teacher candidates and I believe the inclusion classes should be given the same opportunities as the non-inclusion classes. We maintain high expectations for all students’ learning and performance.

Both Mr. Winn and Miss Mack agreed with Mrs. Jewel’s assessment of their teamwork. For example, Miss Mack stated the following:

One of the biggest benefits is for the students, they have three teachers in the classroom which is very helpful. Another benefit is the co-planning that takes place each day and the fact that there are more opinions when we debrief.

In agreement, Mr. Winn made the following statement:

The benefits are that students always have a teacher to work with. Also, it is super helpful to have two other teachers to collaborate with every day. The benefits of this is crazy. Mrs. Jewel and Miss Mack impact each lesson that I teach as they give me input for every lesson. This helps me improve as a teacher while improving student learning too.

Dr. Weston also agreed that the team worked well together. During the focus group, the team talked about how the paired placement provided the opportunity for the mentor teacher to grow in her pedagogical practices as well as the teacher candidates. Each member of the team felt supported and encouraged.

Earlier in the semester the teams worried about becoming dependent on each other and then in the future being in the classroom without a support system, but these worries had subsided by the end of the semester. Another weakness that was highlighted and will be resolved in the next version of the syllabus is that the observation protocols for the teacher candidates that were not the lead teacher were not being used well by either team. In the future we plan to put the protocols in the appendix of the syllabus and provide time frames for implementing them.
Lessons Learned: Questions and Focus Group Protocols to Gauge the Veracity of the Paired Placement Model

These protocols intended to support the paired placement model seem to be serving their purposes. Sending out the questions to the teams early on helped AU to decide if they needed to do any interventions to help the pair of teacher candidates and the mentor teacher to work together in a more cohesive manner. Moreover, the Paired Placement sub-RAC’s protocol help us learn if the teachers are focusing on student growth together. The focus groups have continued to help the subRAC determine how well the paired placement model was implemented and if it met the needs of all of the stakeholders (mentor teacher, teacher candidates, and students).

Columbus State University: Observational Tasks

Columbus State University (CSU) is housed in an urban area servicing a population of approximately 200,000 in Columbus, GA. CSU’s undergraduate mathematics education certification route is modeled after the UTeach program in Austin, Texas, with slight modifications to include a course focused on pedagogical content knowledge of mathematics and science students. CSU also offers a traditional undergraduate degree certifying students in Grades 4-8 in two different content areas. Teacher candidates from both of these programs have opportunities to take place in the paired placement model. Since teacher candidates in clinical experiences are often required to observe others demonstrate teaching when in apprentice and paired placement models, observational tasks are strongly recommended. Because of different contextual situations including state requirements on the number of days of lead teaching, teacher candidates who are not in lead teaching roles need direction on initializing and focusing on important pedagogical processes. Thus, one of the teacher candidates observes and reflects using the instrument “Observation Tasks for the Teacher Candidates When they are Not Teaching” prompts (see Appendix C) while the other takes a lead role teaching.

The prompts from the instrument use short questions requiring teacher candidates to observe the class through specific lenses of: equity, learning, assessment, management, and tools or technology. The other teacher candidate is asked to observe the lead teacher during the lesson and take notes related to the closed-ended prompt questions. Before and/or after the lesson, the teacher candidate and lead teacher are asked to discuss these questions and the associated lens.

Observational Tasks PSDA Overview

During the 2018–19 academic year, Columbus State University implemented a PDSA Cycle as a part of the Paired Placement sub-RAC research protocol. CSU re-evaluated its implementation and the instruments’ effectiveness to prompt teacher candidate reflection and understanding of these lenses during clinical experiences. In the summer of 2018, the questions were shared among the team and revised to meet current needs in each program. The PDSA form (see Appendix D) was completed in the fall of 2018 and shared among the members in order to facilitate discourse on the forms’ intended use, which included expectations for student reflections. The PDSA form helped the Paired Placement sub-RAC track, predict, and hypothesize how the instrument would increase learning in Fall 2018 and Spring 2019 clinical experiences. In the spring of 2019, student reflections were analyzed using the framework and predictions of the PDSA form. After analyzing student responses, the PDSA form was completed in anticipation for what would be modified in the summer of 2019 and enacted the following academic year 2019–20.

Findings from PDSA Cycle

Teacher candidates did not generally reflect with a lens of equity about instructional task creation and implementation as a form of differentiation or other tool to ensure equity. Most teacher candidates noticed class participation and the ability or lack of the teacher to engage disengaged students as places of equity and inequity.
One teacher candidate stated that her mentor teacher “feels [some students] are a ‘lost cause’ [and] were left alone.” While another teacher candidate reflected that “All students are engaged,” and “monitors and gives individual assistance as needed, [she] circulates [and] does not sit down.” As teacher candidates reflected with a lens toward learning, they failed to relate this back to student evidence; however, teacher candidates noticed whole group instruction and a focus around procedures repeatedly during reflections. Problem solving, conceptual understanding, and sense-making discussions were not present in teacher candidates’ reflections, which likely was due to the lack of these interactions in the classroom setting. Teacher candidates often noted the lack of involvement of some part of the class, and many described the effort or lack of effort of the teacher to encourage learning even in questions that were not addressed toward equity. When teacher candidates used a lens of assessment, reflections disclosed teacher’s and teacher candidates’ discourse as it relates to summative assessment. Reflections provided insight to teaching moves made by the lead teacher that do not go beyond what could be seen by observation. However, the prediction was correct that teacher candidate focus was geared toward summative assessment rather than formative. Little evidence was found in teacher candidates’ reflections that disclosed a deeper level of teacher and teacher candidate discussion of technology. Reflections highlighted a lack of TPCK in lesson planning orchestration. Technology was discussed as a pedagogical tool that could be used in any class. Technology also was discussed with a lens toward assessment and as a tool for presentation.

**Lessons Learned: Observation Tasks**

The instrument provided an excellent tool to prompt student thought around critical areas of mathematics education instruction. Using the prompts simultaneously with methods courses provided deeper connections to concepts and practical applications from the field by students. Students also found the prompts useful in helping them focus on certain skills for teaching or high leverage practices. The prompts also provided a structure and opportunity to bring up different topics with leader teachers and potentially taboo topics such as equity.

Not all teacher candidate reflections exhibited a discourse between both the observer and the lead teacher. Though the instrument provided a structure to start conversations between the teacher candidate and the lead teacher, it failed to prompt the need for discourse between the two. Clearer instructions need to be developed that distinguish one lens from another and provide clearer instruction to their implementation in clinical experiences. It is also suggested that these prompts are separated to make clearer connections between course objectives during methods courses.

Potential rewording or inclusion of new prompts for each lens may also be useful for future uses of the instrument. For a lens toward assessment, the Paired Placement sub-RAC looks to move the focus of teacher candidates toward teacher moves that were made in selection of problems, transitions from small group to whole group, etc., that are not evident as primary portions of a lesson. During technology prompts, we would like teacher candidates to seek clearer connections and discussions around the use of tools and technology to implement the observed lesson as it relates to mathematics. Equity seemed to cross-cut many of the students' reflections, but when attending to this specifically prompts that require discourse around task creation and implementation will need to be developed. In addition, a new learnings prompt might provide a more explicit way to connect student learning to assessment evidence. Lastly, prompts encouraging students to reflect on the lead teacher’s management might also include reflections related to micro-messages, equitable instruction, and/or the growth mindset.
University of Hawai‘i at Manoa (UHM): Co-Planning/Co-Teaching

The UHM Institute of Teacher Education secondary mathematics program comprises four courses offered across two semesters, typically during the teacher candidates’ final year of their program. During the fall semester, students take one secondary mathematics methods course (ITE 404G) and an accompanying observation practicum course (ITE 402G). In the spring semester, students are enrolled in the student teaching course (ITE 405G) and the accompanying seminar course (ITE 406). The secondary math program supports both undergraduates and post-baccalaureate students to earn a secondary mathematics teaching license in Hawai‘i. During the fall semester, teacher candidates are in their mentor teachers’ classrooms a minimum of 200 hours. During the student teaching semester, candidates are in their mentors’ classrooms full time and typically take on half of the teaching workload of their mentor teacher starting at the beginning of the semester.

Each member of the UHM pair involved in this project worked with its own primary mentor most of the day, but co-taught two classes (one from each mentor-different grade levels/subjects). Thus, UHM’s paired placement model is a modification on the original paired placement model described in this paper’s overview. Both the mentors and the student teachers attended a one-hour orientation session approximately one month before the student teaching semester began. During this session, some of the research related to the common benefits and pitfalls of the paired placement model were shared, and the team brainstormed strategies for preventing and/or overcoming some of the pitfalls mentioned in the research. In addition, the group developed a group Google calendar and strategies for sharing documents via the cloud. Finally, during this session, the co-planning/co-teaching models were introduced to the teacher candidates, as the mentors already were introduced to these models at the beginning of the observation practicum course.

Co-planning/Co-Teaching PSDA Overview

As UHM is in its first year of implementation, we sought to gain insight into candidates’ perceptions of the implementation of the paired placement model. In addition, UHM used the PDSA Cycle to learn about teacher candidates’ perceptions of the value of co-planning and co-teaching with their peer and mentor. The first goal was particularly valuable, as UHM had to establish a new pair in the middle of the school year, once the original pair was terminated due to student illness (and subsequent withdrawal from the licensure program and the research project). The second goal emerged during the student teaching semester and is influenced by two important discoveries: 1) other institutions (see Columbus University’s PDSA report above) have reported that during co-taught lessons, the non-lead teacher candidate often had no focus or structure to their classroom support; and some members of the Co-Planning/Co-Teaching sub-RAC have noticed that pairs who rely solely on the One Teach/One Assists Co-Teaching model tended to score lower on the MCOP (R. Sears, personal communication, June 26, 2019).

Co-planning/Co-Teaching PSDA Cycle. In addition to the common data collection efforts described in the overview of this paper (i.e., interviews, MCOP), UHM initially planned to informally interview and formally observe teacher candidates every three weeks throughout the student teaching semester (final semester of the licensure program) to learn about their experiences with the paired placement model. However, although during the first few weeks each member of the paired reported that the paired placement was going well, the researcher noted that the candidates primarily worked alone to plan and only used the One Teach/One Assist Co-Teaching model. This left the team wondering whether candidates were possibly using other strategies for their non-observed lessons, and curious as to the candidates’ reasons for not using other co-planning and co-teaching

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2 It is important to note that the researcher acts as both the instructor and field supervisor for all the secondary math program courses.

models in their lesson planning and lesson implementation. Thus, the PDSA Cycle involving a Co-Planning/Co-Teaching Survey was conceived (see Table 1).

Data sources. During this PDSA Cycle, the researcher (acting as the student teaching seminar instructor) assigned the pair of teacher candidates to co-plan and co-teach two lessons that would be formally observed. Thus, the primary data collection tool was the teacher candidate lesson plans and lesson plan and observation notes of the researcher/instructor. Teacher candidates also were asked to complete a survey (via Google forms) to provide more insight into how they were engaging in the co-planning and co-teaching practices.

### Table 1

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<tr>
<th>Co-Planning/Co-Teaching Survey Prompts</th>
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<tr>
<td><strong>Co-Planning Prompts</strong></td>
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<tr>
<td>How have you planned with your peer and/or mentor?</td>
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<tr>
<td>Have you used any of the Co-planning strategies? If so, which co-planning strategies have you used? Why those?</td>
</tr>
<tr>
<td>What are some benefits of co-planning?</td>
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<tr>
<td>What are some drawbacks of co-planning?</td>
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Findings from the PDSA Cycle

Both candidates continued to report that the paired placement model had been a positive experience for them. One candidate shared,

We found that since we are colleagues with a high level of trust and have had experience working together prior to this placement that we can count each other for doing our fair share while we work. We also enjoy passing ideas back and forth in real time to help mold them into what we want faster

Co-planning models used. Both candidates reported that they primarily used the “one plans, one assist” and “one plans, one reflects” models. One candidate shared his reasons for using these two models:

We tend to use these two strategies more often because we both have more expertise with our respective math content that we've worked with since the beginning of the year, so we each take the lead in planning for those classes. However, we are also trying to move closer towards the partner planning or even the team planning model as we are also moving towards a team-teaching model in our classroom.

They also both mentioned that they frequently share their lessons with their mentors and share resources with their peer and their mentors. Additionally, one of the mentors, who is also the math department chair, mentioned that the teaching practices of the pairs have influenced the entire department. The entire department now uses one of the teaching strategies that the pairs used during their student teaching.

Co-teaching models used. Both candidates reported that they have used the one-teach/one assist and parallel teaching models. One candidate explained her choice to rely on the one-teach/one assist strategy by saying:
We have used one teach, one assists the most frequently. It lets one of us act as the main focus of attention while the other can float around and assist students who need a little extra help or have questions. We have also tried parallel teaching. This was useful in creating smaller, more focused groups in which we could conduct an activity with rich discussion and high cognitive demand efficiently.

In addition, during the fourth formal observation which occurred after the survey was disseminated, the university supervisor noted that the pair also used the station teaching model; although, this model was not mentioned by either candidate.

**Survey as an intervention.** The survey prompts (disseminated during Week 9 of a 16-week semester) and the explicit instructions to co-plan and co-teach two lessons may have served as a catalyst and reminder for the candidates to try out the other co-teaching and co-planning strategies. After the survey, candidates endeavored to use more of the co-planning and co-teaching strategies as is evidenced by the addition of a greater variety of co-planning strategies in their lesson plans and co-teaching strategies observed during the formal observations after the survey.

**Lessons Learned: Early Professional Development Needed for Mentors and Teacher Candidates**

At UHM, one candidate mentioned that he felt that the co-planning/co-teaching models were “sprung” on them, and that they would have liked more time to become familiar with the strategies. Other sub-RAC partners have verified similar discussions when implementing the model at their institutions, which indicates that candidates might need time during the previous semester to try out strategies either with their mentor or with their partner. Given that there is no guarantee that pairs will stay together throughout both semesters (as we experienced this year with our first pair), it might be worth considering ways to ensure that teacher candidates are engaging in co-teaching and co-planning with their mentors during their observation practicum in the previous semester. Prior to the fall semester, mentors were provided the co-planning and co-teaching model handouts from the Co-Planning/Co-Teaching sub-RAC and some tips on using the strategies throughout the semester (via email), and students were assigned to co-plan with their mentors during the fall semester. However, the previous comment demonstrates that this is clearly not enough to ensure that co-planning actually occurs between mentors and teacher candidates. The Paired Placement sub-RAC is now considering how we might provide a longer face-to-face workshop for all secondary math mentors and teacher candidates at the beginning of the observation practicum semester that will allow both groups engage in the strategies together (as was reported by Auburn University). In future methods courses, we will also seek to highlight the co-planning aspects of the assignments during the methods course.

**Co-Planning/Co-Teaching Survey (via Google Forms).** The survey as a data collection tools appeared to be appropriate for gathering the type and quality of the data that our institution was interested in during the first year of implementation. In response to a few of the co-teaching prompts, one of the teacher candidates responded that he/she had already answered the question before, stating, “see answer above.” It might be worth considering whether it is necessary or important to keep the co-planning and co-teaching prompts separate. Also, as mentioned earlier, given that the survey seemed to push the candidates to use more strategies, it might be worth disseminating the survey earlier in the semester, so that candidates are encouraged to try out a greater variety of strategies sooner.

**University of Montana—Not All Pairs Succeed**

The University of Montana secondary mathematics education program comprises a 120-credit bachelor’s degree in mathematics including approximately 33 credits of university general education course work; a 41-42 credit mathematics major, which includes one four credit mathematics methods course; 16 credits over three
semesters of field experiences including the one semester student teaching semester; and about 30 additional credits of professional education course work.

Over the most recent 25-year period, on average, just over nine students graduated each year with a Bachelor of Science in mathematics with the mathematics education option. The state prepares 25 to 30 secondary (Grades 5-12) mathematics teachers each year, the majority coming from the two flagship universities in the state. Our professional education program is typically the junior and senior year, and, although, we have 15% of our students at the post-baccalaureate or graduate level each year, the 15-credit student teaching semester culminates the program.

Reflections on Implementing the Paired Placement Model

One common challenge to the traditional student teaching placement scenario is the ability of people to get along; to play fair (Wilkens, Ashton, Maurer, & Smith, 2015); and to establish a needed community of learners (Wenger, 1998) between the student teacher, cooperating teacher, and the classroom of students. This problem is intensified with the paired placement model because three adults instead of two must co-exist in the same classroom. At the University of Montana, student teachers, cooperating teachers, and university supervisors participate in a daylong in-service at the beginning of the experience, learning about what to expect, the desired teaming approach, and the need for open and honest communication. In this report we will share a PDSA Cycle of a failed paired placement. Whereas discussing this breakdown of community as a failure is harsh, we can learn from these relatively few situations.

Using an action research cycle, the PDSA, we investigated the relationship among the paired student teachers and the cooperating teacher. A university supervisor observed the pair co-teaching a lesson at the end of the first week of the semester. The paired student teachers functioned seamlessly, as though they had been team teaching for months, taking turns with lesson components, working independently with small groups, collaboratively with whole group work, and implementing the co-planned lesson with expertise. They shared time driving together to and from school as well. The university supervisor reported no problems as the math teaching practices were evident, the seventh grade students were engaged and demonstrated successful completion of the lesson objectives. No further observations were scheduled for the month, the assumption made that all was working well and would continue to do so.

This assumption was an error, as there were little issues that arose beginning in the second week, unknown to the university supervisor. By the sixth week, upon visiting with the pair—who were no longer even speaking to each other—an agreement was made to work together again, to push forward as each had unique strengths and the surfaced problem of not being at the appointed pick-up place at the designated time in the morning before carpooling to school was in the recent past. This pair, who knew how to work together, had demonstrated they were each proficient in teaching, and even carpooled to school together, but within another two days, decided to permanently split. The cooperating teacher found another teacher in the building to accept one of the paired student teachers and continued to work with the other.

Lessons Learned

At UM, our recommendation, based upon five years of successful paired placements and investigating this one broken pairing, is that one must push forward with working closely with all pairs, even those who seem proficient early on, and listen for minor differences that arise and not abandon these efforts during the first month of paired placements. There are differences that can be overcome, and future teachers become stronger for resolving those. University supervisors and cooperating teachers must listen carefully and frequently in this first month.
Second, there are differences that cannot be overcome, and these are primarily related to an individual’s inner strengths, as well as their physical and mental health. Is the individual strong enough to see that although he/she is not as fast at responding to an individual student question, speed alone is not the issue? If a middle school student states she would rather work with the other student teacher, is one able to accept that does not mean one is not able to function in this classroom? Is one able to see that the other student teacher brings strengths to the classroom, but others in the room also bring strengths? This comparison of student teachers’ abilities to perform in the role of a teacher is natural, and when one individual is unable to work past that and only desires to be the sole teacher in the room so as to avoid any comparisons, it is certain to fail.

Third, when one student teacher shows signs of paranoia and takes actions to sabotage the others in the room, it is best to separate the team and recommend mental counseling. Healthy individuals are essential for success in student teaching placements.

In conclusion, our recent case of a failure for two paired student teachers and one cooperating teacher to complete the semester allows us to reaffirm what others have found in investigating failure in placements (Bullough & Draper, 2004) and the lack of good characteristics of stakeholders in the student teaching placements, namely, the importance of mental and physical health (Koerner, Rust, & Baumgartner, 2002). The PDSA Cycle informs our practices in preparing successful paired placements—listen daily to your paired student teachers and provide reassurance that minor differences are to be expected and can and must be resolved.

**Concluding Thoughts**

Given this year’s findings, we are renewed in our commitment to implementing the paired placement model at our various institution. The instruments we explored through our PDSA Cycles now will provide us additional tools to improve the implementation of the paired placement model across institutions by helping us examine implementation more critically. One of our sub-RAC’s next steps will be to modify our tools to reflect what was learned through the PDSA Cycles reported in this paper. In addition, the members of our sub-RAC are exploring how we might incorporate a few of the same tools and protocols that were studied in this report at the individual institutions across all institutions in the 2019–20 school year. For example, given the findings that mentors and teacher candidates may have needed early experience with using the co-planning and co-teaching models and the observation tasks, it might be that all institutions include a workshop for all parties (similar to the one described by Auburn University) as a part of the paired placement model. Finally, our sub-RAC is now in the process of developing a system for collecting and sharing PDSA data across institutions so that data can be more easily analyzed and compared across institutions. The added benefit of this final step is that it will allow institutions who are considering adopting the paired placement model to have access to lessons learned and implementation tools all in the same place.

**References**


Appendix A

PDSA Cycle Focus on the Veracity of the Paired Placement Model

Teacher Candidates PDSA Cycles
7. How are the three of you interacting?
8. How are the students responding to you?
9. What is going well?
10. How can we better support you?
11. What are your strengths and weaknesses related to implementing equitable teaching practices?
12. At this point what do you see to be the benefits and challenges of the paired placement model?

Mentor Teacher PDSA Cycles
1. How are the three of you interacting?
2. How are the students responding to the teacher candidates?
3. What is going well?
4. How can we better support you?
5. What strengths and weaknesses do the teacher candidates exhibit related to implementing equitable teaching practices?
6. At this point what do you see to be the benefits and challenges of the paired placement model?

University Supervisor PDSA Cycle
1. How are you interacting with the teacher candidates and the mentor teacher?
2. How are the students responding to the teacher candidates?
3. What is going well?
4. How can we better support you?
5. What strengths and weaknesses do the teacher candidates exhibit related to implementing equitable teaching practices?
6. At this point what do you see to be the benefits and challenges of the paired placement model?
Appendix B

Focus Group Questions

Interview Protocol for Graduates of the Program Who Were in Paired Placements

1. What are attributes of the paired-placement model that contribute to successes in your current teaching practice?

2. What are attributes of the paired-placement model that contribute to challenges in your current teaching practice?

3. How did the paired placement internship prepare you to work/collaborate with other teachers to support student learning?

4. In what ways did the paired placement internship enable you to design and implement lessons that build procedural fluency from conceptual understanding?

5. How did the paired placement internship prepare you to take risks and try new teaching approaches in your mathematics classroom?

6. Now that you have been teaching for ________, what would you say are the components of the paired placement internship that have positively impacted your current teaching practice? What components could be added to the model to make it more effective for future candidates?

7. Tell me about a time in your teaching career so far where you felt your experiences in the paired placement internship impacted your actions?

Interview Protocol for Mentor Teachers Who Have Participated with the Paired Placement

9. What are attributes of the paired-placement model that contribute to successes in your current teaching practice?

10. What are attributes of the paired-placement model that contribute to challenges in your current teaching practice?

11. In what ways, if any, did the paired placement internship impact your working or collaborating with other teachers to support student learning?

12. In what ways did the paired placement internship impact your teaching practices? For example, did the emphasis on the mathematics teaching practices influence your own teaching of mathematics?
13. Did the paired placement internship encourage you to take more risks and try new teaching approaches in your mathematics classroom? If so, will you share an example?

14. What would you say are the components of the paired placement internship that positively impacted the interns’ teaching practices? What components could be added to the model to make it more effective for future candidates?

15. Have the interns contacted you about a time in their current teaching career where they felt the experiences in the paired placement internship impacted their actions?

16. Have you served as a mentor teacher in a 1-1 internship previously, if so, which model do you think best serves the interns? Explain.

**Interview Protocol for University Supervisor Who Have Participated with the Paired Placement**

1. What are attributes of the paired-placement model do you think contribute to successes in interns’ teaching practices?

2. What are attributes of the paired-placement model do you think may pose challenges in interns’ future teaching practices?

3. What would you say are the components of the paired placement internship that positively impacted the interns’ teaching practices? What components could be added to the model to make it more effective for future candidates?

4. Have the interns contacted you about a time in their current teaching career where they felt the experiences in the paired placement internship impacted their actions?

5. Have you served as a university supervisor in a 1-1 internship previously, if so which model do you think best serves the interns? Explain.
Appendix C

Observation Tasks for the Teacher Candidates When They Are Not Teaching or Co-Teaching

Suggestions for use: For each observation, teacher candidates should use only one set of questions below and record their observations in their journals. During the observation phase, teacher candidates should list specific activities and interactions happening in the classroom. After the observation, teacher candidates should debrief with their mentor teacher and the person whom they observed. During debriefing teacher candidates should reflect on and discuss their recorded observations.

1. Examine the Lesson through an Equity Lens
   - Are all students engaged in the lesson?
   - Is the teacher using multiple ways of approaching the topic in order to insure student understanding?
   - Is the teacher providing special accommodations for students who need them?
   - Is the teacher ensuring that all students are attaining the mathematical goal for the lesson?
   - Are all students being challenged to reason and make sense of the lesson?

2. Examine the Lesson through a Learning Lens
   - Are the tasks worthwhile for the students?
   - Is the teacher asking questions that help promote student engagement in the task?
   - Is the teacher maintaining a high level of cognitive demand?
   - Are the students making the connections that they need to make?
   - Does the teacher listen to student thinking and respond appropriately, such adjusting instruction or asking appropriate questions?

3. Examine the Lesson through an Assessment Lens
   - What evidence of students’ understanding of the concepts or skills did you see?
   - Is the teacher using a variety of ways to assess students’ understanding?
   - Did the teacher elicit and use evidence of student thinking?
   - Did the teacher use student feedback to modify instruction?

4. Examine the Lesson through a Tools and Technology Lens
   - What tools and technology are being utilized to help students understand the concepts?
   - What materials are being used in power points or on board legible and organized appropriately?

5. Examine the Lesson through a Management Lens
   - Does the teacher have clear routines for the students to follow?
   - Does the teacher facilitate cooperative learning groups well?
   - Does the teacher call on students systematically or does the class answer in concert?
   - Do the students know the consequences of their actions both good and bad?
### Appendix D

#### PDSA FORM WITH PROMPTS

<table>
<thead>
<tr>
<th>Questions</th>
<th>Predictions: Make a prediction for each question. Not optional.</th>
<th>Data: Data you'll collect to test predictions</th>
<th>What were the results? Comment on your predictions in the rows below.</th>
</tr>
</thead>
</table>
| 1. How did the instrument help students highlight equity in the classroom? How did the instrument drive discussion in the classroom with the mentor? | Students will notice inequitable situations where students may be held to different expectations. Students will justify teacher actions based on student behavior. | 1. Observation Reflections  
2. Discussion around these topics during methods class or other connection points when implemented. |  |
| 2. How did the instrument help students highlight learning in the classroom? How did the instrument drive discussion in the classroom with the mentor? | Students will find teaching and learning focused towards procedures and performing well on standardized testing. Cognitive demand will be lowered through teacher and student interactions. | 1. Observation Reflections  
2. Discussion around these topics during methods class or other connection points when implemented. |  |
| 3. How did the instrument help students highlight assessment in the classroom? How did the instrument drive discussion in the classroom with the mentor? | Student will focus reflections more on summative assessment rather than formative assessment. Evidence will suggest unclear connections of modification of instruction to formative assessment. | 1. Observation Reflections  
2. Discussion around these topics during methods class or other connection points when implemented. |  |

#### PDSA FORM WITH PROMPTS

<table>
<thead>
<tr>
<th>Questions</th>
<th>Predictions: Make a prediction for each question. Not optional.</th>
<th>Data: Data you'll collect to test predictions</th>
<th>What were the results? Comment on your predictions in the rows below.</th>
</tr>
</thead>
</table>
| 4. How did the instrument help students highlight tools and technology in the classroom? How did the instrument drive discussion in the classroom with the mentor? | Tools and technology will be discussed by students in terms of technological pedagogical knowledge with little or no emphasis on mathematical technological pedagogical knowledge. | 1. Observation Reflections  
2. Discussion around these topics during methods class or other connection points when implemented. |  |
| 5. How did the instrument help students highlight management in the classroom? How did the instrument drive discussion in the classroom with the mentor? | Students will focus on controlling misbehavior rather than encouraging behavior that is conducive to learning. | 1. Observation Reflections  
2. Discussion around these topics during methods class or other connection points when implemented. |  |

Details: Describe the who/what/when/where of the test. Include your data collection plan.

The 5 different questions each relate to a different lens from the instrument. The student journal or reflections may be collected as they are assigned or at the end of the semester. It is encouraged to debrief each of these lenses as they are assigned or implemented in the field.

2) DO (Briefly describe what happened during the test, surprises, difficulty getting data, obstacles, successes, etc.)

TBD

4) ACT (Describe modifications and/or decisions for the next cycle; what will you do next?)

Based on the answers to the two questions about the survey, we may revise the questions or the frequency of administering the protocol.