

Providing Clinical Experience for Preservice Chemistry Teachers Through a Homeschool Association Collaboration

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Abstract

The number of students homeschooled in the United States is steadily increasing, and parents of these students continue to look to community resources for their curriculum as they educate their children. As clinical experiences associated with two of their methods courses, preservice chemistry teachers teach a chemistry course twice a week to homeschooled students under the supervision of their methods instructor. The course is a collaboration between the Department of Chemistry and the local homeschool association (HSA), providing the homeschool students with high school chemistry instruction and experiences in the chemistry laboratory and providing preservice teachers with experiences teaching high school aged chemistry students. This article describes the design of this collaboration aligning it with the research literature of successful clinical experiences for the development of preservice teachers. In addition, initial evidence and feedback from teachers provides support for this collaboration as an effective alternative to traditional clinical experiences in typical high school settings for preservice science teachers. Challenges to carrying out this type of clinical experience are discussed along with tips for teacher educators looking for a different form of effective clinical experiences for their preservice teachers. While improvements continue to be made, the collaboration between the HSA and the methods courses has been successful for students, both homeschooled and preservice, and continues as a clinical experience at our university.

Introduction

Quality clinical experiences, also referred to as field experiences, prior to student teaching are vital to preservice teachers' learning and development as teachers (Darling-Hammond, Hammerness, Grossman, Rust, & Shulman, 2005; Grossman, 2010; NRC 2010). However, for many teacher education programs providing sufficient, quality clinical experiences in K-12 classrooms for their preservice teachers is challenging (Fraser & Watson, 2014; Grossman, 2010) for reasons including finding qualified and available cooperating teachers and saturation of the local K-12 schools with preservice students from their programs. Due to the challenges, many programs have developed alternative clinical experiences for preservice teachers that are not in a traditional K-12 classroom to help them develop as teachers. Examples of alternatives include microteaching (Darling-Hammond et al., 2005) or peer-teaching rehearsals (Benedict-Chambers, Aram, & Wood, 2017), virtual classrooms

(Kennedy & Archambault, 2012), and experiences in informal educational settings (Cartwright, 2016). While not a traditional K-12 classroom setting, alternative clinical experiences often have several characteristics research has identified as helpful to preservice teachers' development as teachers (Darling-Hammond & Baratz-Snowden, 2007; Grossman, 2010) allowing the preservice teachers to improve their teaching skills.

Like many teacher education programs, our preservice chemistry teacher education program faces challenges finding quality local clinical experiences for our students. Within a 15-minute drive of the campus, there are only three high schools with approximately 1800 students each and a small laboratory high school all of which have a limited number of available chemistry teachers and are heavily used for clinical experiences in courses and student teaching placements. Thus, like many schools, we have looked for alternative ways to provide our preservice chemistry teachers in our two content-specific methods courses with high quality clinical experiences. We found one in the form of a collaboration with a homeschool association [HSA]. This article describes this alternative clinical experience for preservice secondary science teachers which simulates a traditional secondary science classroom in some aspects but is not in a 9-12 classroom. In this clinical experience, as described in detail below, preservice secondary chemistry teachers teach a chemistry course for homeschooled students offered on the university's campus by the Department of Chemistry. While the number of preservice teachers who have participated in this form of clinical experience is small thus far, the research literature and evidence collected provides support for this as a clinical experience that helps the preservice chemistry teachers learn and develop as teachers. As the instructor of the content-specific methods courses which this clinical experience is paired, I also reflect on the benefits and challenges to using it as a clinical experience over a more traditional placement in a K-12 school.

Characteristics of effective clinical experiences

Often when referring to the characteristics which make clinical experiences effective in developing preservice teachers, the characteristics are described for the set of clinical experiences a preservice teacher has over the course of his/her entire program (Darling-Hammond et al., 2005; Grossman 2010); any singular clinical experience will not have every characteristic. The design of the clinical experiences as a whole for a preservice teacher in a teacher education program should strive for the characteristics of effective clinical experiences (Grossman, 2010), however these characteristics also provide guidelines for developing individual clinical experiences as well. Darling-Hammond & Baratz-Snowden (2007) provide a concise list of characteristics of clinical experiences that have been shown to help preservice teachers develop their skills as teachers:

Successful clinical training experiences have the following characteristics:

- *clarity of goals*, including the use of standards guiding the performances and practices to be developed;

- *modeling of good practices* by more-expert teachers in which teachers make their thinking visible;
- *frequent opportunities for practice* with continuous formative feedback and coaching;
- *multiple opportunities* to relate classroom work to university course work;
- *graduated responsibility* for all aspects of classroom teaching; and
- *structured opportunities* to reflect on practice with an eye toward improving it (p. 124: Emphasis in original).

These characteristics of effective clinical experiences continue to be supported in the research literature (e.g. Grossman, 2010; Grossman et al., 2009). While the list suggest that the number of clinical experiences is important ('frequent opportunities'), quality of those experiences is also very important. Research has identified that fewer high quality experiences have as much impact on preservice teachers' development as a larger quantity of lower quality experiences (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009; Grossman, 2010; Ronfeldt & Reininger, 2012).

Not explicitly mentioned in the list above, but implied in the descriptions, is the importance of the mentor, co-teacher, cooperating teacher, supervisor, or whatever term is used for the experienced professional guiding the preservice teacher during the clinical experience. Preservice teachers need a supportive experienced professional providing them with ideas, guidance, and feedback as they develop (Darling-Hammond et al., 2005; Hollins, 2011; NCATE, 2010). As described below, when used as a clinical experience for preservice chemistry teachers, the chemistry course for homeschooled students has many of the characteristics of clinical experiences shown to make them successful.

Homeschooling

The opportunity for this chemistry course for homeschooled students described in this article first developed in 2010 when a local homeschool association approached the Department of Chemistry to ask if there was a way for their high school aged students to perform some chemistry experiments on campus. As the number of homeschooled students in the United States has been steadily increasing since the 1990s (Redford, Battle, & Bielick, 2017), homeschool associations (HSAs) or networks have been established, many with a strong local presence, (Kelley, 2017) to "provide an easily accessible network of communication and resources which will better equip parents, enhance the experience for students, and educate local communities about the viability of homeschooling" (para. 1, CAHSA, n.d.). HSAs have approached local organizations like YMCAs or museums to offer courses for their students, or the organizations have begun offering the courses on their own when the population of homeschooled students in the local area is high enough for the venture to be successful (Wang, 2007). In the case of the course described in this article, the approach by the local HSA initially resulted in the department's Chemistry Club hosting the students a few times a semester to perform some experiments. After three academic years and a change in leadership in the Chemistry Club, the club was no longer interested in leading these

experiments although the department appreciated the outreach the course provided. The methods instructor at the time initially said the preservice chemistry students could set in and provide the same experience the club provided for clinical hours as part of the methods courses. After a year of this, it was recognized that the preservice teachers could be more involved in the design, choice, and assessment of the activities providing a more authentic teaching experience. Thus, with the agreement of the HSA, the experiments shifted to a “class” for homeschool students which would cover topics typically taught in an introductory high school chemistry class. This is the current course, described below, which provides clinical experiences for the preservice chemistry teachers along with the educational opportunity in high school chemistry for the homeschool students.

The Homeschool Chemistry Course

Context

At Illinois State University, secondary teacher education programs reside within the content discipline department, i.e. the English teacher education degree is part of the English Department, chemistry teacher education degree part of the Department of Chemistry, etc. Secondary preservice teacher education majors take a core set of professional education courses from the College of Education, many of which include clinical experiences, but they also take content specific methods courses offered by their major departments. Preservice chemistry teachers have two chemistry specific methods courses prior to their student teaching semester. The first course (CHE 161), which can be taken as early as the second semester of their freshman year, provides an introduction to chemistry teaching and is designed, in part, to help students make an informed decision about their future careers. CHE 161 is offered in spring semesters and, depending on students’ schedules and timing of entrance into the teacher education major, has freshman to senior-level students in it. The enrollment in this course has ranged from 3 in one semester to 8 preservice teachers in another semester in the three spring semesters since the homeschool collaboration with preservice teachers began. Preservice chemistry teachers take the second methods course (CHE 301) during the fall semester just prior to their student teaching. This course is only taken by senior-level students. Between 3 and 6 preservice teachers have enrolled in CHE 301 since the collaboration began.

Logistics and Structure

Once university course times for the fall semester are set, the HSA sends an email to its listserv about “registering” homeschool students for a chemistry course at our university (Note: there is no official registration process through the university. It is simply generating a list of interested students and parent contacts in the spring.) This invitation email from the previous offering course is in Figure 1 and provides a good overview of the course.

Figure 1 (Click on image to enlarge). Registration email from the HSA to parents about the chemistry course.

Registration is now open for the [University] Homeschool Chemistry collaboration. If you have a student ready for Chemistry next year, this is an excellent option to consider.

General Information:
This Chemistry class is two semesters. The first semester will be taught by CHE 301 students - these students are planning to become chemistry teachers upon graduation, and gain great experience in all aspects of running a class by working with our homeschoolers. These students have quite a bit of chemistry knowledge, and therefore bear more responsibility to teaching the various Chemistry subjects. In other words - more chapters will be covered 1st semester than in the 2nd.

CHE 301 is not offered 2nd semester, and typically the student teachers from 1st semester will go into public schools during that time to student teach.

CHE 161 is the class that takes over 2nd semester. This is an Introduction to Teaching Science Seminar. So these students don't have as much Chemistry knowledge, and are taking this class to decide if teaching science is what they want to do. So they will cover fewer chapters than in the first semester.

Class Times:
Homeschool students will meet for class twice a week on [University] campus: Tuesdays from 9 - 9:50am, Fridays from 1 - 2pm.
The Parent meeting (as well as students getting to know other students) will be Friday August 26th from 1 - 2pm.
The first day of class will be Tuesday, August 10th.

Chemistry Book:
Chemistry: Matter and Change published by Glencoe in 2004.
This can be purchased used online. After some discussion, it was agreed upon to go with a traditional High School Chemistry book (instead of a more Applied Science type book). The reason for this is because the flow of learning makes more sense and does a better job of building upon each other.
The WJOL.E book will not be completed; instead, the class will explore content typical of a first year chemistry course in the public schools (through Gas Laws).

Math Pre-requisite:
Basic Algebra is needed. A student need not be all the way finished with the course. It is okay to be taking it at the same time that they are in this Chemistry class. The student teachers will be aware that the homeschool students may range from freshmen, all the way up to juniors or possibly seniors. They will work with students accordingly.

Costs:
There will be a lab fee for each student. The specific amount has not yet been determined. In past years it was around \$25. In addition to book purchase and lab fee, each student will need laboratory goggles.

Grade assignment:
In the past, the homeschooler's grade was calculated by the student teachers based on tests, quizzes, presentations, lab/lab reports, and homework assignments.

Parent Involvement:
This is very much an individual decision. I myself had little involvement with my son as he is very strong in science. I did work with him to keep up with online communication as he did not had a need to do that prior to this. Other parents learned alongside their students who were not as strong in order to help them succeed. Still others relied on the student teachers to give their students extra help when needed. The 100 students did a great job of offering ways for students to get help outside of the classroom as well as earn extra points with additional practice worksheets and extra credit on tests.

Commitment Deadline: May 28
A commitment from the Homeschool families planning to participate is needed by May 28.
Class size will be in the area of 15 students and will be first come, first served.

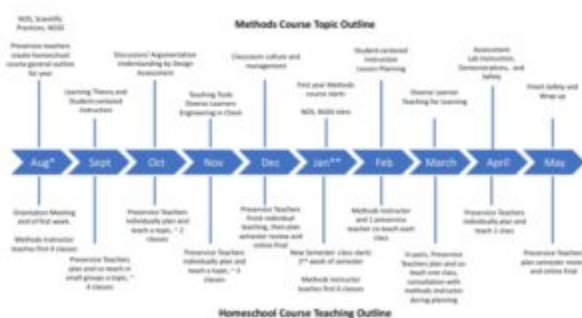
Thus far the number of homeschool students registering for the course, several of which register just before school starts, has ranged from 8 to 12 students each year. From the contact list generated, parents are emailed specific details about the course two weeks before the fall semester begins. The course begins the second week of each semester to allow the preservice teachers a week of class before beginning the clinical experience. This week allows the preservice teachers to learn the expectations for the course in terms of assignments and clinical experiences and get organized for their semester and their teaching of the homeschool class in light of their other courses. The homeschool students and their parents arrange their own transportation to and from campus.

There is a parent orientation meeting usually the Friday of the first week of classes during the fall semester. During this meeting, the preservice teachers and homeschool students are introduced to each other, tours of university facilities to be used are given, and laboratory safety regulations and requirements are reviewed. Parents are asked to sign waivers and safety contracts to allow their students to be on the campus and in the laboratories [1]. Students also sign a safety contract. The parents are asked to sign a waiver allowing the classes to be video-recorded so preservice teachers can watch and reflect on their teaching. They pay a small lab fee for the year (approximately \$20), are provided with information on accessing the free learning management software (LMS) being used [2], and have the opportunity to ask questions.

As mentioned in the email to the parents, the fall semester is taught by the CHE 301 preservice teachers and the spring semester is taught by the CHE 161 preservice teachers. Figure 2 provides sample timeline for the academic year for the methods course and the homeschool courses. The times for the homeschool course are “the lab hours” of the CHE

301 and 161 class times, so preservice teachers register for the clinical hours as part of their course schedules, there is a room for the course in the university schedule and the HSA knows the time of the course.

Figure 2 (Click on image to enlarge). Methods course and homeschool course sample timeline. *First Semester: Methods course met twice a week for 3 hours total on Tuesdays and Thursdays, Homeschool course met for 2 1-hour classes on Tuesdays and Fridays ** Second Semester: Methods course met once a week for 2 hours on Wednesdays, Homeschool course met for 2 1-hour classes on Wednesdays and Fridays.



As the methods instructor, I teach the first classes to the homeschool to give the preservice teachers time to lesson plan and prepare for teaching along with providing model science instruction. Figure 2 indicates how the teaching for the homeschool class is divided. In CHE 301 in the fall, during the time I am teaching, the preservice teachers use the *Next Generation Science Standards* (NGSS) (NGSS Lead States, 2013), which are our state science standards, and other chemistry curriculum resources to decide what we should teach the homeschool students and in what order. They create a general outline of the year, along with lesson planning and teaching in cooperation with me as the methods instructor. In the fall semester, depending on the number of preservice teachers registered for CHE 301, they typically co-teach a set of lessons with a partner, then plan a set of lessons to teach individually (See Figure 2). Collaboration of content and teaching ideas/methods occurs among all the preservice teachers and myself, but lead teacher(s) are set for each course meeting. Preservice teachers who are not lead teachers observe, provide feedback, and may help individual groups of students if the lead teachers ask. In the spring semester with the less experienced preservice teachers in CHE 161, again I teach the first lessons of the semester on topics based on the course outline from the previous semester's preservice teachers. Then the preservice chemistry teachers in CHE 161 meet with me individually, and we co-plan a single lesson to co-teach (See Figure 2). They then plan and co-teach a lesson with another preservice teacher in the course with strong guidance and feedback from me. Finally, they each plan and teach a lesson independently to the homeschool students.

Depending on the number of preservice teachers in the methods course they might get to co-teach more than one lesson, but in this first semester methods course they are only required to independently teach one time.

During both methods courses, preservice teachers are required to submit lesson plans, which include learning objectives, student prior knowledge, instructional activities, assessment plans, and materials among other things, 48 hours prior to teaching. Each methods class, conversations occur about the homeschool course in terms of the previous teaching and what is upcoming. I always encourage them to use what they are learning in the methods course in their lesson planning. I also often meet with them outside of class time to discuss ideas and resources as they are planning before they turn in their formal lesson plan. All lesson plans are returned to students with feedback for implementation, changes to make it more student-centered, and other comments at least 24 hours before they teach. After teaching, the preservice have structured teaching reflection assignments due, one of which includes watching a video of their teaching. After they complete their reflection, they receive comments both on their reflection and their teaching specifically. (Note: As a methods instructor and the cooperating teacher for the homeschool class, I have found if I provide my comments on their teaching prior to their reflection, the opinions and ideas I get in the reflection are my own so I wait until the reflection is complete before providing my teaching feedback.) The preservice teachers, when they are not teaching, have observations assignments asking them to identify aspects of the course we have discussed and to reflect on the effectiveness for student learning of the instruction. These observations assignments typically start the conversation in the next methods class period, discussing what they saw and what was reflected from our class in the homeschool course. One of the questions in the observation assignments explicitly asks them to connect what they saw to the class. There are other assignments for the methods course not directly related to the homeschool course, e.g. reading assignments and reflections. In addition, during the methods course, we use examples and actions from the homeschool class during discussions and class activities. For example, when assessment is the topic of class, the preservice teachers analyze assessments they have used when they taught and develop new or alternative ones based on their experiences with the homeschool students.

Aspects of Effective Clinical Experiences in Homeschool Chemistry Course

From the nature of the collaboration and opportunities which arise from the course, the Homeschool Chemistry Course in design has numerous characteristics of clinical experiences shown to help preservice teachers learn and develop. Table 1 connects Darling-Hammond and Baratz-Snowden (2007)'s characteristics of "successful clinical experiences" discussed previously with the design features of the Homeschool Chemistry Course and its implementation just described.

Table 1 (Click on image to enlarge).

Alignment of the characteristics of successful clinical experiences with the homeschool chemistry course

Successful Clinical Experiences*	Homeschool Chemistry Course
Modeling of good practices	Methods instructor teaches course at times allowing for modeling of good practices and discussion of choices
Modeling of good practices	Co-planning and co-teaching with methods instructor allows for modeling of good practices with first-semester preservice teachers.
Frequent opportunities for practice	The homeschool course is two times a week for almost the entire semester and thus far the number of preservice teachers each semester is small, so they are in the class often and teaching often.
Multiple opportunities to relate classroom work to university course work	The Homeschool course is part of the "lab" hours for the methods courses for all students. With the direct connection between them, easy to connect field experience to course work directly with examples, observations, and asking them to try things from the methods class with the homeschool course.
Graduated Responsibility	Design in both semesters of the course allows the preservice teachers to slowly work towards independent teaching
Graduated Responsibility	Preservice teachers' first experience with the homeschool course is in CHE 161, the spring semester, in which the methods instructor guides and co-teaches more. In CHE 301, second opportunity they help plan the course and work towards planning series of lessons rather than one.
Structured opportunities to reflect	Reflection assignments developed in both methods courses. Video waivers by parents allow for classes to be recorded and preservice teachers to watch themselves with reflection prompts. Group reflection of the homeschool course is also a part of the course structure.

*Successful clinical experiences from Darling-Hammond & Baratz-Snowden (2007)

As shown in Table 1 and as described above in the structure and assignments for the course, numerous characteristics of effective clinical experiences are part of the structure of this course which is a collaboration with the HSA. The main characteristic of this structure that provides many advantages is the shared experience of all the preservice teachers in the methods courses. Unlike more traditional clinical experiences for preservice teachers in which one or two students are assigned to a classroom and others assigned to a different classroom, the Homeschool Chemistry Course allows all of the preservice teachers in the same class. Though at times they have different responsibilities in the class as an observer or teacher, the context, events, and student reactions are the same for all the preservice teachers. With the shared experience, two aspects of successful clinical experiences become much easier to achieve as a methods instructor: 1) engagement with model instruction or instructional techniques and 2) connection of the content from the methods course to the clinical experience.

As the methods instructor I teach, co-teach, or co-plan lessons allowing me control of the type of instruction and instructional strategies the preservice teachers experience within the limits of the equipment, space, time, and number of students. This control for the methods instructor is often not present in more traditional clinical experiences when teacher education programs are in need of willing teachers and classrooms to host preservice teachers. Some of the preservice teachers might see model instruction, but since they are likely not all in the same class that is not guaranteed. Experiences with and models of good research-based effective science instruction as preservice teachers help them develop to use these skills in their classrooms (Darling-Hammond & Baratz-Snowden, 2007; Loughran, 2014). In addition, as the supervisor for the course and as mentioned above in the assignment descriptions, I provide the preservice teachers with formative feedback and guidance on their lesson plans,

as they teach, after they teach, and on their reflections, acting as the strong mentor or professional which is important to effective clinical experiences (Hollins, 2011; Loughran, 2014).

The shared experience of the homeschool class also allows for connections between the methods course content and the clinical experience to be made easily for all the preservice teachers. This important aspect of effective clinical experiences helps the preservice teachers connect theory and practice (Grossman et al., 2009; Hollins, 2011). In the methods course, I can say “remember when..” as an example of content from the methods class in action in a classroom and all the preservice teachers will have seen it. The preservice teachers do not need to describe examples from their independent clinical experiences to the entire class for us to have “real” examples connecting theory and practice. Also, the reverse can occur easily. When something happens in the homeschool class, in the methods part of the class we can make connections to the theory to explain it or to help find solutions for it.

Limitations

While many aspects of this clinical experience align with the desired characteristics for clinical experiences for preservice science teachers, there are some characteristics of this clinical experience that not ideal. As suggested earlier, I, the methods instructor, can provide model instruction to the preservice teachers to the degree the environment allows, but the environment has a few constraints. The number of homeschool students has been twelve at its highest, which is not your typical high school chemistry size, and the students do not represent a diverse population in terms of race or socioeconomic status. All preservice teachers at our university are required to have 50 hours of diverse clinical experiences out of a minimum 100 hours prior to student teaching, which this experience then does not fulfill. We do a lot of student-centered instruction and inquiry using reform-based practices and curriculum materials, but meeting only twice a week, it is not a “typical” high school class. It is more akin to a collegiate model of chemistry instruction. The course does not meeting every day of the week, and when it meets it is only for 50-60 minute classes rather than hour and a half block periods which some high schools use if a class does not meet every day. If we do not ask the students to do some learning on their own time, as collegiate level courses are often structured, then we would not get far in the content. And the students do not necessarily have access to each other to form study groups or have conversations outside of class like college students do or even traditional high school students. Because of this significant independent work is assigned between classes, which often involves watching lectures or other less active learning instructional methods. These difference from the high school model are discussed directly with the preservice teachers often throughout the methods course; we have discussions about how lessons might be different in high school setting rather than a homeschool course setting.

Another challenge for me as the instructor is that I have become the instructor of two courses, the methods course and the homeschool course. I am not only the preservice teachers' instructor teaching their methods course, but I am also the instructor of the homeschool class or the 'cooperating teacher' in a traditional clinical experience. I am responsible for the homeschooled students' learning in that class also. While this can be a benefit because I can demonstrate model instruction and use it during the methods courses to make connections between the theory and my teaching practice, I am also responsible for another course. I communicate with parents (which I don't do for college students), make sure waiver forms are followed, safety rules are enforced, resources are available, assignments completed, the learning management software for the homeschool students is working, etc. I am the only constant between the fall and spring semester for the homeschool students. When they sign up for the course, as Figure 1 shows, the parents and students know the preservice teachers will be instructing the course, but they still expect chemistry to be taught and learned, and I am the teacher responsible for it, so in some ways it has increased my teaching load without credit for teaching another course.

Initial Supporting Evidence

The Homeschool Chemistry Course described here (for both methods courses, with the class meeting two days a week) has only occurred in two academic years (2015-16 and 2016-17), and we have a small program. Thus few preservice chemistry teachers have had the opportunity yet to experience two semesters with the homeschool course as their clinical. However, since the collaboration did evolve over time, some current student teachers and some recent graduates of the program had experiences teaching the homeschool students. As described below, their responses to the Homeschool Chemistry Course as a clinical experience provide additional support for its use as an effective clinical experience beyond the support from the research literature described above.

Teachers Reflections on Homeschool Course as Clinical

As reported elsewhere (Boesdorfer, 2018) when asked to reflect on their clinical experiences as preservice teachers during a phone interview, five current teachers had mainly positive things to say about their experiences teaching the homeschool students. Through interviews, they were all asked to reflect generally on their clinical experiences as preservice teachers. All five discussed their teaching of the homeschool students as a positive experience that helped them develop as teachers. Below are a few comments about the homeschool teaching experience which are representative of at least 3 out of the 5 current teacher comments if not all of them (also described in Boesdorfer (2018) in more detail):

- the continuity of the semester with them, and um, I don't know, it just seems more representative of what I experienced as a teacher [than clinicals in other courses]
- It's really the only time in our, in our clinicals where we got to have some sort of ownership over the class.

- It was very helpful in terms of lesson planning and actually teaching a lesson.....I think that it is a great opportunity to learn

These former students who are now teaching mentioned frequent contact (quote 1), the graduated responsibility of the clinicals (quote 2), and the experiences the class (quote 3); all of these align with Table 1 and aspects of successful clinical experiences. All five recommended keeping the homeschooling course as a clinical experience. The interviews were part of an exploratory study looking at the perceptions of those who participated in the homeschool course as part of their initial teacher preparation (Boesdorfer, 2018).

Current Student Teachers Reflections on Homeschool Course as Clinical

During their student teaching semester, two preservice chemistry teachers who had taught the homeschool course for at least one semester prior to student teaching were surveyed about their clinical experiences overall. Like the teachers described above, these student teachers also indicated that the experience with the homeschool class was useful to them.

The graduated responsibility was an aspect they both focused on heavily in their responses. For example, one said: "It provided a nice transition between being in another teachers' classroom as an observer and being a student teacher where you are completely in charge of the classroom. We were in charge of the Home School Group, but it was a shared responsibility plus a Professor present just in case." Not surprisingly though, they also though both focused on how much they were learning in student teaching. For example,

I'm continuing to grow through my student teaching position but in new ways then I was able to with the Home School Group. I'm developing more classroom management and interacting with students more whereas during the Home School Group I was developing my teaching and lesson planning more.

As they are supposed to, the homeschool clinical experiences prior to student teaching helped prepare the preservice teachers for student teaching by giving the graduated responsibility in a structure environment where they continued to develop as teachers (Castle, Fox, & Souder, 2006; Darling-Hammond, 2005; Grossman, 2010). When asked directly, both recommended continuing the homeschool course for clinical experiences. Other than the positive course evaluations which cannot be used for research purposes, data has not been collected from current preservice teachers as yet.

Conclusions and Future Directions

There are positive and negative aspects to using a homeschool course as a clinical experience for preservice science teachers, but as a program we find the benefits described above outweigh the negative aspects and is worth the effort for our preservice chemistry teachers. We continue to collect data on graduates and feedback from current students to continually assess the effectiveness of the clinical experiences and improve or modify it as

needed. With the limited availability of clinical placements around our university in high school chemistry classes and other clinical experience requirements for the chemistry preservice teachers' other courses, this is one of our best options to provide an experience that helps develop skills to be an effective high school chemistry teacher. We address some of the challenges to using the homeschool course, for example, the lack of diversity among the homeschool students, through other clinical experiences in the professional education sequence of courses and other program requirements.

Of course, the ability to offer this clinical is highly dependent on the HSA, and its help organizing and contacting potential students. If the number of homeschool students in the area were to decline significantly or parents are no longer interested in maintaining the HSA, this clinical experience would likely end. Using the homeschool course as a clinical experience is a work in progress, but one which the initial analysis suggests is an effective clinical experience; it might be an option for other programs looking for alternative forms of clinical experiences to meet their preservice teachers' needs.

[1] With a new university minors on campus policy, the future permissions will also include a permission for minors to be on campus along with our previous waivers. All waivers, including the working in the laboratory, were created under consultation with and approval by university legal counsel.

[2] Since the homeschool students are not university students, they cannot use the university's LMS and parents need access to it as well. Recently, *Schoology* has been used as the LMS to share materials and grades.

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