

APTeach: Professional Learning Communities as an Invaluable Method of Reform

by
Morgan Smith

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Thesis Committee:

Dr. Greg Rushton, Thesis Director

Dr. Fatma Kaya, Second Reader

Dr. P. Gregory Van Patten, Thesis Committee Chair

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APPROVED:

Dr. Gregory T. Rushton, Thesis Director
Director, Tennessee STEM Education Center

Dr. P. Gregory Van Patten, Thesis Committee Chair
Department Chair, Chemistry

ABSTRACT

APTeach.com is a website where chemistry teachers digitally convene to participate in professional development both synchronously and asynchronously. Zoom live discussions and Slack channels whereby members exchange ideas about their practices are the modes of diffusion in the community. Specifically, the synchronous discussions are led by one or more Teacher Leaders – members of the community who meet a relatively strict set of criteria who are among the most experienced on the website. This study aimed to quantify the hypothesized benefits of these interactions on members' perception of their own practice through qualitative and quantitative analysis. It was revealed that the sample, largely, reported positive emotional outcomes after persistently attending the webinars.

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INTRODUCTION

Teaching is an inherently vulnerable task. Tasked with commanding a room five days a week and explaining the workings of the physical world, educators of all disciplines often find themselves in the habit of solitude amongst their peers. Collaboration with fellow educators would entail volunteering not only how one explains a topic to their students, but the teachers' understanding of their own discipline. For no guaranteed benefit to their students, teachers can view professional development as a gamble with their time and ego.

Professional development, hereinafter referred to as PD, can be any engagement of educators outside of administrative and in-class duties that are often, but not always, required for retention of licensure to teach. It takes form in many ways, chiefly – courses, workshops and conferences. Designed as fertile ground for continuing education, poorly executed PD can be a burden for teachers and taxpayers alike. However, to eliminate PD entirely in a field as diverse and fast-paced as education would be a disservice to students and teachers alike.

Research shows that teachers are willing and optimistic about the potential for PD to be worth their time. According to Boston Consulting Group in a study furnished by the Gates Foundation, 1,300 teachers, administrators and professional development providers alike could agree on what a productive, compelling professional development excursion might entail (K-12 Education Team, 2015). The teachers, specifically, reported the highest satisfaction with PD that is collaborative in nature (K-12 Education Team, 2015).

Meaning, of course, that despite the best efforts of the government to initiate productive discourse amongst educators, the format of being lectured at is missing the mark – arguably, the same problem seen on the other side of the podium.

How, then, do educators address this problem in their students? Many opt to implement team-based learning, interactivity and even “flipped” formats where students watch lectures online and come to class for practice problems in the presence of their instructor (Comeford, 2016). An online professional development community accommodates both hypothesized needs of teachers: a) a remote community for easier access regardless of geographic locale, time constraints and the need for travel, and b) a space where teachers feel comfortable challenging themselves.

An entry in Phi Delta Kappan magazine proposed that in a successful learning environment, “leaders must create and sustain settings in which teachers feel safe to admit mistakes, to try (and possibly fail), and to disclose aspects of their teaching” (Darling-Hammond & McLaughlin, 2011). APTeach is a website designed not only to encourage productive discourse between teachers, but to facilitate it. On the user’s end, there are resources and materials easily accessible, as well as an intimate community of AP Chemistry teachers interested in refining their content knowledge and innovating their thinking. As trained scientists, AP Chemistry teachers should be able to keep an open mind and be willing to reconsider their tried-and-true belief system about teaching chemistry.

Advanced Placement (AP) are courses with accompanying assessments meant to gauge and reward preparedness for college-level learning. Of the 38 AP courses – a

number of which are portfolio, not exam based – the chemistry course has the lowest participation rate of students taking the exam for college credit (Warne, 2017).

Discordantly, data from the 2018 AP exams show that students who opt to take the exam pass at a rate consistent with other, similarly challenging science topics (College Board, 2018). With the emergence of STEM graduates as the most in-demand sector of the labor force, government and private entities both have a vested interest in doing what they can to increase retention in STEM majors (Noonan, 2017).

Here lies the importance of having an online community for professional development of AP Chemistry teachers. It is known that students who enroll in AP courses are poised for higher college admission than students who do not attempt to earn college credit in high school (Sadler et al., 2010). It is also known that higher socio-economic status (SES) correlates with increased incidence of AP enrollment (Sadler et al., 2010). Thus, returning to the question of effectively allotting taxpayer funds, students from lower SES backgrounds are simultaneously less likely to enroll in AP classes, and – in the case of chemistry – earn college credit for it. This further decreases their already disproportionately low likelihood of applying and being admitted to a college – a well-known indicator of upward social mobility. Certainly, equality of opportunity in Americans of all socio-economic backgrounds is of interest to the government.

The potential benefits of online professional development are numerous. With a community like APTeach, the educators themselves are the ones populating the site with content. This means that content comes from every discipline and competency level of teaching, allowing for the free exchange of ideas between teachers with different levels of

experience. Perhaps most importantly, the vulnerability necessary to challenge one's belief system may be easier to summon during online discourse as opposed to spoken exchanges. It may be a natural assumption, but to quantify this phenomenon as it relates to APTEach.com is the central investigation of this paper.

This study was guided by the following question: Does being a persistent member of APTEach.com improve members' perception of their practice as quantitated by positive language in their feedback interviews? Countless members have volunteered their time to help improve APTEach by agreeing to sit for an interview with a researcher with the larger grant-funded study, PDConnect. In this paper, eleven teachers' interviews are recounted and analyzed to determine if APTEach is an especially effective means of remote professional development.

MATERIALS AND METHODS

Methods

This research was necessarily qualitative and quantitative. One data source, the attendance of teachers to the online workshops, had been recorded throughout the term and can be an objective marker of engagement with the website. The other data source, interviews with members who agreed to share their insights with the research team, had to be distilled through other means in order to surmise any results. This was achieved through coding the interview transcripts according to Johnny Saldaña's *The Coding Manual for Qualitative Research* (Saldaña, 2016).

A “code,” according to Saldaña, is a “qualitative inquiry [. . .] most often a word or short phrase that symbolically assigns a summative, salient [. . .] attribute for a portion of language” (4). All of the data analyzed in this manner was text. The findings of *that* research was cross-referenced with persistent attendance to the site to elucidate if there is a correlation between a teacher's perception of their practice and participation in the live workshops of APTEach.com.

The coding was performed in Dedoose, a computer-assisted qualitative data analysis software developed by University of California, Los Angeles . The specific methods of coding within Saldaña's text include a myriad of approaches, e.g. descriptive coding, concept coding – among others. The final choice was emotion coding, an approach Saldaña suggests is ideal for beginner coders (124). Emotion coding was

chosen because of its broad applicability to qualitative research and its relevance to interpersonal relationships, a necessary data point to capture in this research.

Emotion coding entails recording instances of mostly adjectives that denote states of mind. For example, when participants said words like, “exhausted,” or “thankful,” these passages would be coded and inductively categorized as negative and positive language, respectfully. Every unique word used for an emotional state was coded first, then the words were categorized by the broader sentiment the word conferred. This approach was enough to deduce a member’s general impression of the site and – more importantly – their impression of teaching AP chemistry in times of remote learning.

The coding simply measured occurrences of “positive” and “negative” words; these two categories were further divided up into “descriptive language” and “emotional language” *within* the “positive” and “negative” categories. Saldaña notes that while most emotions can be neatly distinguished between positive and negative, it is an inexact science and “researchers must be wary of playing amateur psychologist” (128-129). However, in this research, instances of a teacher employing a word were a simple measure of their outlook. No inferences had to be made about their emotional state.

The sub-categories were necessary to distinguish between a teacher describing their recalled experiences and their emotional state e.g. “I thought that the webinar went great” as opposed to, “I feel great about the upcoming material.” These were coded in accordance to Daniel Goleman’s definition of a emotion as, “a feeling and its distinctive thoughts, psychological and biological states, and range of propensities to act” (289). Thus, words that did not impart any information about these parameters were categorized

as “descriptive language.” Recording these words did, however, lend context to how a teacher interprets their circumstances. It was important to capture when a teacher used a word like, “challenging” in reference to their practice even if it did not explicitly lend information about their emotional state.

Of note: all of the interviews were conducted in November and December of 2020. Thus, of the twenty Zoom workshops that were analyzed, eighteen of them had already taken place. The remaining two workshops were included to make attendance – the independent variable – a more robust dataset given that the sample size is a mere eleven. The interviews all followed the same protocol developed by the researcher conducting the interviews. The questions were not explicitly designed to serve this investigation, but rather the larger research project and its applications to scale the site.

<p>INTERVIEW QUESTIONS</p> <p>1. How do you feel about teaching APChemistry right now?</p> <ul style="list-style-type: none">a. What is going well for you as a teacher?b. What are your greatest challenges right now? <p>2. How did you hear about the APTeach? What made you interested in it?</p> <ul style="list-style-type: none">a. What were you expecting, and what has been your experience so far?b. How have you participated in APTeach?<ul style="list-style-type: none">i. Slack?ii. Zoom?iii. Website?iv. Meeting with AP teachers outside of classtime <p>3. How has your participation affected your teaching?</p> <ul style="list-style-type: none">a. Has it affected your motivation? Energy level? Excitement? Sense of belonging/connectedness to others?b. Has it impacted your planning? Your decisions about what to teach and how to teach it?c. Can you give any examples of specific ways your participation in APTeach has impacted you and your practice? <p>4. For regular users: Why have you been coming to the Zoom meetings?</p> <p>For past users: Why did you come? How was it helpful/unhelpful? What could APTeach do to improve the likelihood you seeing you more often?</p> <p>For non-users: Do you know about the ways that you can participate in APTeach? What could we do to make it more likely for you to be able to come?</p>	<p>5. Did the online Zoom discussion impact your teaching practice? How?</p> <ul style="list-style-type: none">a. Have you joined any breakout room discussions? If so, are these small group interactions helping you to reflect on your teaching practices?b. Are there any takeaways from small group interactions that you have implemented in your teaching? If not, will you be implementing? What are those ideas? <p>6. Have you shared what you learned on the APTeach website with others? Do you think it's worth investing time to participate in the community?</p> <p>7. What about APTeach do you think is most and least effective? How could it best meet your current needs as a teacher?</p> <p>Conclude: Is there anything that you would like to share with us? Any questions that you might have for us?</p>
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Figure 1. The interview protocol.

Sample

The demographic data relating the sample to the entirety of APTeach comes from an intake survey the members answer upon signing up. This survey collects demographic data on the population of the site, a total nearing 1,500 as of writing this paper. The sample of teachers in this study consisted of eleven individuals who had attended three or more webinars between April 16th and December 17th in 2020. Twenty webinars in total had been held in this window.

This interval of time was chosen as it reflects, to a reasonable estimation, a window of time where the COVID-19 pandemic impacted every teacher in the sample. As COVID-19 was declared a pandemic by the World Health Organization on March 11, 2020, it was reasoned that more than a month later was sufficient to ensure that each teachers' practice was upended in some way from the virus – and consequently, that feelings of uncertainty were controlled for (“Archived: WHO Timeline”, 2020). While not every teacher was remote at the time of the interview, the window of time that analysis took place needed capture what kind of impact coronavirus had on professional development.

The website was *not* designed in response to distance learning. However, March 2020 saw an immense increase in participation in the Zoom live discussions that drastically changed the scope of this research (see Table 1). As such, the teachers that made up of the population of the website prior to the pandemic was just a fraction of the eventual APTeach community and the sample had to be reworked from what was presented in the proposal for this project.

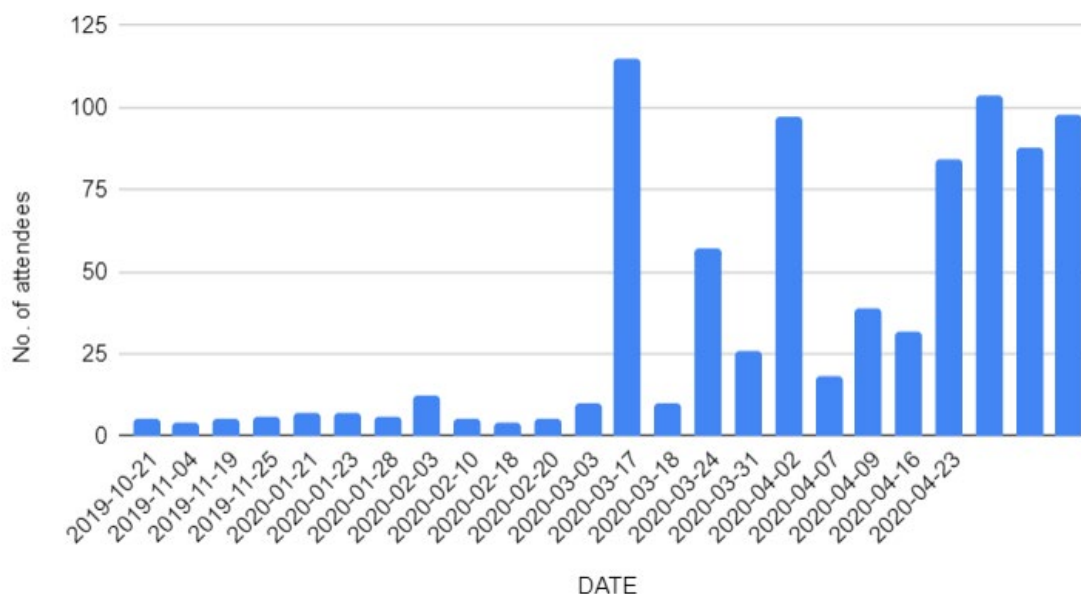


Figure 2. A graph illustrating the uptick in attendance in the Spring of 2020.

Of the eleven teachers, 54% characterized their school as “Suburban Public” among seven choices, which is roughly reflective of the website as a whole, where 42% of members chose the same option. All but one of the teaches describe themselves as female and a majority chose not to disclose their ethnicity. The highest degree earned by 81% of the sample was Masters, with the rest holding doctorates. It should be noted, this sample over-represents teachers with Ph.D’s compared to the site-wide population. Of all the teachers who chose to respond to this question, 0.015% reported having a Ph.D. compared to 19% of the teachers whose interviews were coded.

Further, 45% of the sample reported their students have, on average, scored between three and four on the AP exam. Given that 44% of the 158,847 students who took the exam in 2019 scored between three and four, this indicates that the population of APTeach is well representative of AP chemistry teachers across the United States

(College Board). Additionally, 37% total of respondents said their students score between three and four, suggesting that the sample is a fair depiction of users on the site. Notably, the disparity between the national average (44%) and the user average (37%) suggests that APTeach is reaching its intended audience – teachers who are perhaps less efficacious and need professional development to meet them where they are.

RESULTS

Quantitative Data

Ultimately, fifty codes were used to elucidate the interviewees' perception of their practice. These were developed after a first cycle of coding where all emotional language was tabulated and then re-coding the interviews with the final list to ensure that all instances of similar language were captured. In all, four hundred and thirty-three excerpts from the transcripts were coded and analyzed. An average of thirty-eight codes were applied to each transcript.

As illustrated in Table 2, the codes were divided up in to "Implementation," "Positive" and "Negative." Only when a teacher made an explicit reference to adopting something they learned in a webinar was the former code used. This metric will be measured against positive language to determine if there is a correlative relationship between users' positive feelings about their practice and their adoption of their peers' methods.

		Names										Codes		
		Wu	Sohum	Liz	Leigh	Laure	Kathryn	Jo	Jennifer	Diane	Betsy	Aysun	Totals	
51	8													Implementation
Negative														
														descriptive language
24	4													"challenging"
2	2													"cheating"
15	3													"hard/difficult"
2	2													"impossible"
5	2													"struggle"
2	1													"survive"
1	1													"trouble"
1	1													"weakness"
emotional language														
2	2													"afraid/panic"
2	1													"concerned"
2	2													"frustration"
3	3													"isolated"
5	5													"nervous/worried"
11	11													"overwhelmed"
2	2													"pressure"
4	4													"stressed"
3	3													"unconfident"
Positive														
2	2													descriptive language
5	3													"beneficial"
3	3													"easier"
4	4													"generous"
11	11													"helpful/useful"
12	12													"important"
13	13													"love"
2	2													"meaningful"
15	15													"nice/cool"
5	5													"positive"
9	9													"productive"
34	34													"resources"
14	14													"support"
8	8													"well"
emotional language														
3	3													"amazed"
15	15													"appreciate"
4	4													"comfort/calm"
4	4													"confident"
12	12													"connected"
1	1													"excited"
7	7													"grateful/thankful"
36	36													"great/good"
3	3													"lucky/fortunate"
2	2													"respect"
1	1													"satisfying"
1	1													"surprised"
1	1													"upbeat"
22	22													Totals

Figure 3. Complete list of codes and recorded instances.

All code incidences											
% Implementation	17%	14%	20%	10%	4%	8%	16%	17%	24%	8%	7%
% Positive	83%	79%	73%	77%	61%	81%	58%	58%	64%	64%	57%
Implementation	4	4	8	3	2	3	6	6	8	4	3
Negative	0	2	3	4	17	4	10	9	4	15	17
Positive	19	22	30	24	30	29	22	21	21	34	26
Total Codes	23	28	41	31	49	36	38	36	33	53	46
Attendance	75%	55%	90%	75%	20%	35%	20%	35%	30%	45%	45%
	Betsy	Laurie	Leigh	Diane	Liz	Kathryn	Jo	Sohum	Aysun	Jennifer	Wu

Only Emotional Coding											
% Positive	100%	88%	79%	86%	73%	100%	83%	73%	100%	56%	35%
Negative	0	1	3	1	4	0	2	3	0	8	11
Positive	9	7	11	6	11	7	10	8	5	10	6
Total Codes	9	8	14	7	15	7	12	11	5	18	17
Attendance	75%	55%	90%	75%	20%	35%	20%	35%	30%	45%	45%
	Betsy	Laurie	Leigh	Diane	Liz	Kathryn	Jo	Sohum	Aysun	Jennifer	Wu

Figure 4. Tabulated Dedoose codes in Excel.

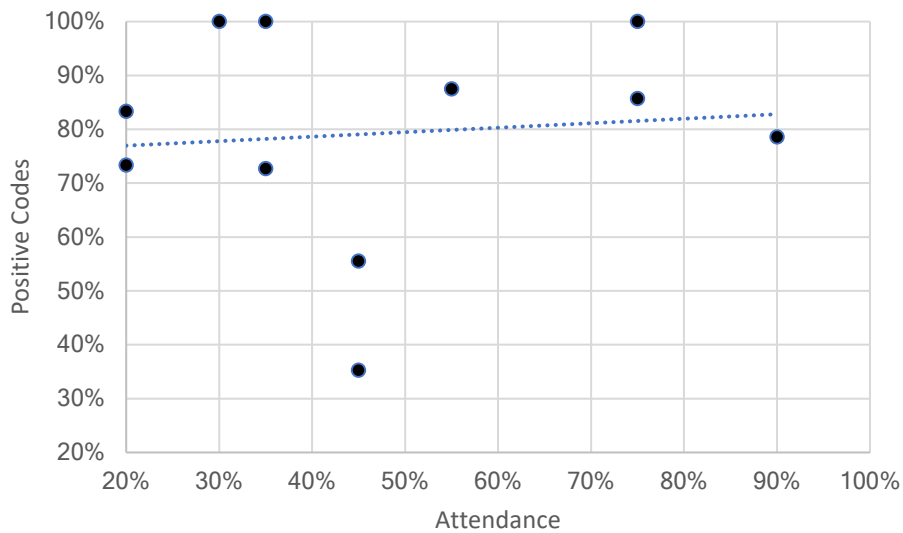


Figure 5. Attendance of Zoom webinars plotted against percentage of positive emotional coding.

Table 3 depicts the slightly positive slope of the linear regression of the attendance plotted against positive emotional codes. The correlation coefficient of these data is 0.098, as determined by a least-squares analysis in Excel. The metric of “positive codes” is simply the number of positive codes divided by the number of total emotional codes – meaning the number of “implementation” codes was deducted from the total codes for this finding, as were “descriptive language” codes.

The data are scattered and variable, as to be expected from research of this nature and (lack of) magnitude. This can either suggest what it does at face value: that attending APTEach webinars may confer a slightly more positive outlook by users, as quantitized by emotional coding in Dedoose. Or, alternatively, that the impact of APTEach on teachers' feelings is not adequately captured by the interview questions and the results are inconclusive. C

Further, attendance was plotted as a function of both categories of codes *and* implementation. This analysis was more aligned with the hypothesis, possibly owing to the fact that it is a larger breadth of data. Reasonably, most interviewees do not use an excess of language denoting emotion in their natural speech. Thus, descriptive language had to be measured to discern the impact of attending the webinars. Not considering teachers' use of words like, "productive" or "beneficial," would be a disservice to the research and the platform even if they are not emotions as defined by Goleman (289).

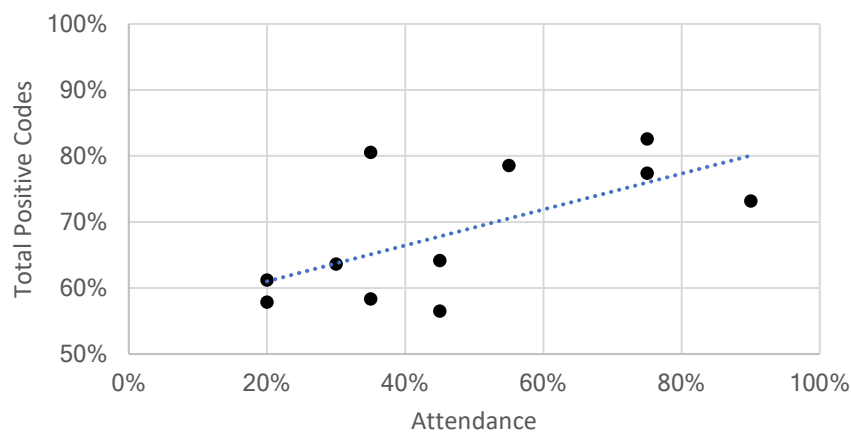


Figure 6. Attendance of Zoom webinars plotted against percentage of total positive codes.

The table above illustrates the findings of a more closely defined linear relationship between the two variables. The correlation coefficient of the findings is 0.368 – a vastly closer relationship than purely emotional coding – however, still a modest R value. Nevertheless, a relationship in any capacity supports the hypothesis that APTeach is an effective means of remote professional development for AP chemistry teachers.

Qualitative Data

As transcripts are the primary source of data in the investigation, a qualitative analysis is warranted. Capturing the nuance of words in a spoken exchange can be done with software like Dedoose, but may detract from substantive discussion about the results. As well, sources of error may be obscured by participants speaking with metaphors. Qualifiers, i.e. “I feel *really* confident” are weighed no differently than other instances of the same word, meaning the degree to which a teacher feels an emotion is not accounted for in the quantitative data.

Laurie’s transcript made a more explicit reference to the benefit of APTeach as a means of connecting teachers with different levels of experience: “So, had I not had the [...] opportunity to meet him through APTeach I might not have all the resources that I have, because I may have been afraid to ask” in reference to Michael Farabough, another teacher who worked closely with the College Board as an AP reader. At the time of her interview, Laurie had nine years of teaching AP chemistry, but still found utility in attending the webinars – a sentiment echoed by many of her cohorts in the sample.

Farabough came up a multitude of times in the transcripts; he is intimately tethered to the community and had hosted or co-hosted seven of the twenty webinars in the study.

Another teacher, Jennifer, had this to say about what drew her to APTeach in the first place: “I mean, I think the fact that it was primarily for AP chemistry teachers. That and also I knew names of people. So if I knew who was involved then I was like, ‘Oh, this is gonna be good.’” Name recognition in the AP chemistry community is few and far between. As a collaboration between three universities, APTeach casts a wide net and connects teachers of a high stature in the community with less experienced teachers through a medium that they both have to seek out and *want* to participate in. Tellingly, the teacher with the least amount of full-time teaching experience in the sample, Aysun, articulated her experience with APTeach as such:

“They were welcoming all the teachers, no matter what their experience was. I would have been a little scared to join, but they were open to accept everybody. When I joined the first workshop, they generally do these meetings at night like eight o'clock I was amazed to see over one-hundred chemistry teachers coming together, talking about chemistry and how to teach better. That's the first time I saw that.”

Further in her interview, Aysun touches on a critical facet of the framework of this study. APTeach is meant to be a self-sustaining community and facilitating feelings

of adequacy in teachers is the central tenet of being able to scale the website and reach more classrooms. Aysun, who attended just 30% of webinars, expressed confidence that she would be able to contribute more to the webinars once she had more experience.

“I was [...] quiet because I don't have a lot to share yet but I'm sure I'll have a lot more to share later, especially after teaching at least for a year, obviously in the breakout room I join the conversation, but I see that some other experienced teachers, they have a lot more to share and I generally am like a student, I listened to them and find out how to teach it better.”

While the sample size is still practically anecdotal, the verbiage used in these feedback interviews clearly demonstrates a gratitude for APTeach and the sense of community it provides. It is worth noting that – of the eleven total teachers – Aysun had the highest percentage of “Implementation” codes in her feedback interview. 24% of coded language in her interview were explicit references to adopting methods used by more experienced teachers. Most likely, this can be explained by Aysun’s disproportionate need for teaching materials compared to the more experienced teachers. However, *if* implementation correlates to positive language in the feedback interviews was inconclusive.

DISCUSSION

The findings, though only mild correlations, are what was expected at the outset of this research. In essence, APTeach is an implementation of the approach described in the Gates Foundation's *Teachers Know Best: Teacher's Views on Professional Development*. The findings of that study were the responses of more than 1,600 teachers across no specific disciplines and served to quantify something that K-12 educators can relay intuitively: professional development needs to be more practical and collaborative to meet teachers' needs. Thus, modeling the analysis on the presupposed needs of teachers as elucidated in the 2014 article yields affirmative findings.

Four of the eleven teachers in the sample had fewer than five years of teaching experience. The first five years is a critical window of time to intervene and support mathematics and science teachers, as evidenced by a 2008 issue of National Center for Education Statistics where it was found a disproportionate number of teachers leaving the practice in 2008 were in their first five years of teaching (*Attrition of Public School Mathematics and Science Teachers*, 2008). The results of this investigation are hard to compare with previous years, as the circumstances are so different and data about teacher attrition in times of remote instruction has yet to be published. However, it stands to reason that teachers should require the same – if not more – support at a peer level compared to findings published in 2008.

As it has been expressed by a number of researchers, APTeach is the supplement to teachers' practice that experienced teachers wished they had had access to earlier in their careers. However, APTeach is a far cry from only being a resource for new teachers

to develop their practice. As previously mentioned, a critical framework of this study was Linda Darling-Hammond and M.W. McLaughlin's *Policies that Support Professional Development in an Era of Reform*. Reframing teachers as continual learners is a central tenant of that research and subsequent literature following.

The following excerpt captures this sentiment well: “And like I said, it also kind of calms me down, knowing that you know we should be maybe on unit this but I'm only right here and other people are there too and it's fine” from Betsy's interview. Betsy's quote harkens directly back to the aforementioned article where it is argued that teachers must be able to admit shortcomings in their practice in order to develop as educators (Darling-Hammond & McLaughlin, 2011). Her candor lends insight to one of the most elusive, hard-to-quantify aspects of this intervention – the sense of community and the ease of minds that imparts on the teachers.

In that 1995 article, the Stanford researchers wrote “Effective professional development involves teachers both as learners and as teachers and allows them to struggle with the uncertainties that accompany each role” (598). While feelings of uncertainty were undoubtedly heightened in the academic year of 2020, the impact of a continual learning community like APTeach is clearly demonstrated by the incidence of affirmative positive emotional language in teachers' interviews.

That is just one measure of the efficacy of APTeach, however. Perhaps a better indicator of the value of attending the webinars is the volume of teachers who demonstrated commitment and enthusiasm to improving their practice by being a part of this community. While this research may have had too small of a sample size – or simply

have taken place in too turbulent of circumstances to draw more definitive conclusions – the willingness of countless teachers to participate in voluntary professional development during their precious weeknight hours is a sign in and of itself of the perceived value of APTeach to its intended audience.

The intent of this paper was to capture and illustrate the reverence that these teachers have for the platform. Even if the quantitative data do not deliver a particularly decisive verdict on the intervention, every teacher interviewed conceded that APTeach was worth their time – not just the eleven in the sample. The nineteen additional members who sat for interviews and shared their experience all independently arrived at the conclusion that APTeach is a valued part of their practice. This consensus is undoubtedly a testament to the efficacy of APTeach Zoom webinars as a professional learning community.

WORKS CITED

- “Archived: WHO Timeline - COVID-19.” *World Health Organization*, World Health Organization, 27 Apr. 2020, www.who.int/news/item/27-04-2020-who-timeline---covid-19.
- “Attrition of Public School Mathematics and Science Teachers.” *National Center for Education Statistics*, May 2008, nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2008077.
- College Board, 2019, *2019 Program Summary Report*, research.collegeboard.org/programs/ap/data/archived/ap-2019.
- Comeford, L. (2016). Team-Based Learning Reduces Attrition Rates in a First Semester Chemistry Course. *Journal of College Science Teaching*. 46(2), 42-46. http://dx.doi.org/10.2505/4/jcst16_046_02_42
- Darling-Hammond, L. & McLaughlin M. W. (2011). Policies that Support Professional Development in an Era of Reform. *Phi Delta Kappan* 76(8), 597-604.
- Goleman, Daniel. *Emotional Intelligence* . Bantam Books, 1995.
- K-12 Education Team. (2015). *Teachers know best: Views on professional development*. Seattle, Washington: The Bill and Melinda Gates Foundation.
- Noonan, R. (2017). *STEM Jobs: 2017 Update (ESA Issue Brief #02-17)* <http://www.esa.gov/reports/stem-jobs-2017-update>
- Sadler, P. M., Sonnert, G., Tai, R. H. & Klopfenstein K. (2010). AP: A Critical Examination of the Advanced Placement Program. Harvard Education Press. pp. 119-137.
- Saldaña, Johnny. *The Coding Manual for Qualitative Researchers*. SAGE Publications Ltd, 2016.
- Warne T. W. (2017). *Research on the Academic Benefits of the Advanced Placement Program: Taking Stock and Looking Forward*. <https://doi.org/10.1177/2158244016682996>

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IRBN001 - EXPEDITED PROTOCOL APPROVAL NOTICE

Friday, October 25, 2019

Principal Investigator **Gregory Rushton** (Faculty)
Faculty Advisor NONE
Co-Investigators Samuel Karanja
Investigator Email(s) *gregory.rushton@mtsu.edu; sgk2f@mtmail.mtsu.edu*
Department TSEC and Chemistry

Protocol Title ***PDConnect: A scalable community approach in improving instructions in AP Chemistry nationwide***
Protocol ID **19-2037 (19-1037)**
Funding Information **IES #R305A180277**

Dear Investigator(s),

The above identified research proposal has been reviewed by the MTSU Institutional Review Board (IRB) through the **EXPEDITED** mechanism under 45 CFR 46.110 and 21 CFR 56.110 within the category (7) *Research on individual or group characteristics or behavior*. A summary of the IRB action and other particulars in regard to this protocol application is tabulated below.

IRB Action	APPROVED for ONE YEAR		
Date of Expiration	10/31/2020	Date of Approval	10/19/18
Sample Size	40 (FORTY)		
Participant Pool	Primary Classification: Healthy Adults (18 or older) Specific Classification: Current AP chemistry teachers		
Exceptions	1. Collecting participant contact information is allowed. 2. Permitted to use video/audio recording for data collection (restrictions below) 3. Approved to administer consent online (restriction below)		

Restrictions	<ol style="list-style-type: none"> 1. Mandatory active informed consent; the participants must have access to an official copy of the informed consent document signed by the PI. 2. Identifiable personal information must not be retained beyond the data processing stage. 3. Inclusion/exclusion criteria must be followed as proposed. 4. Identifiable information that includes audio/video recordings and handwriting samples must be deidentified as proposed in the protocol. 5. Online informed consent and data collection must not begin before they are reviewed by the IRB.
Comments	NONE

IRBN001
Compliance

Version 1.3

Revision Date 03.06.2016 Institutional Review Board
Middle Tennessee State University

Office of

This protocol can be continued for up to THREE years (**10/31/2021**) by obtaining a continuation approval prior to **10/31/2020**. Refer to the following schedule to plan your annual project reports and be aware that you may not receive a separate reminder to complete your continuing reviews. Failure in obtaining an approval for continuation will automatically result in cancellation of this protocol. Moreover, the completion of this study MUST be notified to the Office of Compliance by filing a final report in order to close-out the protocol.

Post-approval Actions

The investigator(s) indicated in this notification should read and abide by all of the post-approval conditions imposed with this approval. [Refer to the post-approval guidelines posted in the MTSU IRB's website](#). Any unanticipated harms to participants or adverse events must be reported to the Office of Compliance at (615) 494-8918 within 48 hours of the incident. Amendments to this protocol must be approved by the IRB. Inclusion of new researchers must also be approved by the Office of Compliance before they begin to work on the project.

Continuing Review (Follow the Schedule Below:)

Submit an annual report to request continuing review by the deadline indicated below and please be aware that **REMINDERS WILL NOT BE SENT.**

Reporting Period	Requisition Deadline	IRB Comments
First year report	9/30/2019	A progress report was received on 09/25/2019 requesting for a continuing review (CR). The CR conducted in accordance with Expedited Review Category 8 using the report determined that the protocol is in good standing and the study can be continued for an additional year (IRBCR2020-029)
Second year report	9/30/2020	NOT COMPLETED
Final report	9/30/2021	NOT COMPLETED

Post-approval Protocol Amendments:

Only two procedural amendment requests will be entertained per year. In addition, the researchers can request amendments during continuing review. This amendment restriction does not apply to minor changes such as language usage and addition/removal of research personnel.

Date	Amendment(s)	IRB Comments
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12/03/2018	Request to add Shaghayegh Fateh (sf3u - CITI28917043) as a coinvestigator has been received (12.01.2018) and approved.	NONE
10/22/2019	The following student workers are added to the protocol: (1) Morgan Smith (mas2ea-CITI33814931), (2) Bilal Gunes (CITI33739906), and (3) Zubeyde Demet (CITI337e9946).	IRBA2020-067

Other Post-approval Actions:

Date	IRB Action(s)	IRB Comments
NONE	NONE.	NONE

Mandatory Data Storage Requirement: All of the research-related records, which include signed consent forms, investigator information and other documents related to the study, must be retained by the PI or the faculty advisor (if the PI is a student) at the secure location mentioned in the protocol application. The data storage must be maintained for at least three (3) years after study has been closed. Subsequent to closing the protocol, the researcher may destroy the data in a manner that maintains confidentiality and anonymity.

IRB reserves the right to modify, change or cancel the terms of this letter without prior notice. Be advised that IRB also reserves the right to inspect or audit your records if needed.

Sincerely,

Institutional Review Board
Middle Tennessee State University

Quick Links:

[Click here](#) for a detailed list of the post-approval responsibilities.
More information on expedited procedures can be found [here](#).