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Summative Evaluation

Principal Investigator: Louise Ann (“Lou Ann”) Lyon, PhD

Informal Learning in Computer Science

Social and Conceptual Factors Related to Women's
Persistence

NSF Project #1612527

etr.

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Executive Summary

In 2016, ETR received a National Science Foundation grant to study, under Principal Investigator Louise Ann (“Lou Ann”) Lyon, PhD, a newly formed, real-world organization dedicated to helping women in the workforce learn to write computer code. This project formed a partnership between a research team with experience in computer science (CS) education and learning sciences research and a newly fashioned practitioner team focused on building a grassroots, informal, volunteer group created to help women help themselves and others learn to write computer code. This research-practitioner partnership had a two-pronged focus, first on improving the program offered to learners through making adjustments based on evaluation findings, and second on investigating the phenomenon of how women in the workforce informally learn CS skills that enable them to rewrite their career paths to contribute to what we know from research. The context of the study was situated in the virtual community that has formed around the phenomenally successful Salesforce Customer Relationship Management software platform. This Exploratory Pathways project aimed to fill a gap in the research; we know little about the phenomenon of adult women in the workforce who are patching together resources to learn CS skills with a goal of job enhancement or job change.

Our overarching research question in this study was: **In what ways are informal CS learning opportunities being used and created by adult women, what are their experiences with those opportunities, and how does this suggest ways to enhance those opportunities in the future to increase effectiveness in broadening access to and engagement in informal CS learning experiences for women?**

This project took an ethnographic approach to studying the informal learning (both through online, written resources and through sharing of knowledge with others) of the women involved in a 10-week, virtual Women’s Coaching and Learning group. The organization of this group consisted of learners—novice coders in the Apex language that is used on the Salesforce software platform, of coaches—more knowledgeable coders, and of a steering committee that ran the group and created the informal curriculum followed in the 10-week course. The research team worked closely with organizers of and participants in the organization to collect data about learner’s social and conceptual experiences in group.

The key findings from this study include:

- College-educated, adult women of varying ethnicities in the workforce become interested in learning to code when they see the utility for solving business problems, inspiring them to seek out both informal (e.g. online tutorials) and non-formal (e.g. one-day workshops) routes for learning to code.
- Some women such as these become committed to helping other women learn to code after seeing the lack of women in software development and experiencing the male-dominated software developer learning platforms. This commitment can take the form of voluntarily creating female-focused learn-to-code organizations. In the case of this study, the organizers designed their program on a school model, with instructional material presented by those with more experience in a class-like setting with assigned homework-like exercises to be done by novices between class sessions.
- Participants note a more comfortable learning atmosphere in a women-only setting, citing two main differences between the studied group and the larger, male-dominated developer community: the abundance of unsolicited verbal support and the welcoming of novice questions.
- Informal women’s learn-to-code groups can be an instrumental step on the pathway to a software development job.

- Findings from this study suggest that organizations wishing to boost adult women's preparation and participation in the software workforce could create a supportive atmosphere for learning through unsolicited verbal support and welcoming novice questions. Focusing learning content on properly-sized business problems of the type they are familiar with in their current work would help enhance their learning for job enhancement or job change.

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Introduction: The Setting

With the growth of the popular Salesforce CRM (customer relationship management) cloud-based software, a new platform for software development has become widespread. Companies that pay for Salesforce SaaS (Software-as-a-Service) require Salesforce administrator employees (“admins”) to configure the software for their purposes. However, when business needs require customization beyond what is available in the point-and-click administrative interface, development work in the Salesforce Apex programming language—similar to Java—is required. To meet these needs, some Salesforce admins are teaching themselves to code in Apex—either to move into development work themselves or to better communicate with and oversee external developer contractors.

The encouragement by the Salesforce company of communication and informal learning among all the users of their software platform has allowed for both virtual and in-person communities to arise around skill building in administration of and development of Salesforce software. Within this context, an administrator who was teaching herself to write Apex code formed an organizing committee that created a women’s coaching and learning learn-to-code community. The group founder had a self-taught background in procedural programming, and upon her introduction to the Salesforce platform she attempted to teach herself to code in Apex. She became frustrated trying to learn the object-oriented theory, finding that available resources were insufficient. Apex step-by-step tutorials were aimed at learners who understood object-oriented ideas. Salesforce documentation and developer guides were obscure and difficult to use without explanation. Short-term classes taught at the annual Dreamforce conference simply led learners through steps, without time for questions or any depth. A Java text recommended to the founder had syntax explanations but left out topics such as unit testing that were required in Apex. The Salesforce-sponsored online forums (called “Success Community” at the time) offered help for learners, but the asynchronous nature of the communication meant that by the time an answer was offered, the details of the inquiry had been forgotten.

In addition to gaps in the learning resources, the founder had also experienced what she interpreted as gendered interactions detrimental to women. She had experienced asking a question in a development forum, only to be “slapped down” by male developers. It was these experiences that led to her interest in forming an all-women’s learning group, through which she envisioned that learners would gain confidence that they could learn to code, would be committed to giving back to the community, and would find a home where they would feel comfortable asking for help. She envisioned participants would finish with enough confidence to be able to ask for help in online developer forums, signaling that they now were fledged members of the software development community of Salesforce.

In the early-2010s, the founder took the opportunity at an annual Dreamforce conference to find women who were developers and talk about her frustrations and her idea of an all-women’s coaching and learning group. From these conversations, she put together an advisory group who participated in bi-weekly planning meetings that resulted in the formation of the women’s coaching and learning group. From the beginning, the founder and the advisory board had a focus on increasing diversity in technology; they had noticed that there was a pool of women who were part of the Salesforce admin community who would be poised to take a next step to development work leading to a financial benefit and a higher-level job. The founder had three goals for learners in the nascent group: (1) having a built-in mentor to ask questions of, (2) a safe space to make mistakes, and (3) a group of others to hold learners accountable.

From the advisory board connections and conversations, a steering committee was built. Members of this committee built a 10-week curriculum, engaged volunteer coaches, and recruited learners from the pool

of current admins interested in learning software development. This coaching and learning group has been running these learn-to-code sessions twice a year from 2015 to the present.

In 2015, Dr. Lyon, the PI on this NSF AISL project joined the steering committee of the women's coaching and learning group, piloting a small research and evaluation project both to assist the organizers to improve the program and to gather some data about women in the workforce teaching themselves to code. From this, an NSF AISL Pilots and Feasibilities proposal was planned, submitted, and funded. This summative evaluation report recaps that project.

Research Questions and Method

Research Questions

Our overarching research question in this study was: **In what ways are informal CS learning opportunities being used and created by adult women, what are their experiences with those opportunities, and how does this suggest ways to enhance those opportunities in the future to increase effectiveness in broadening access to and engagement in informal CS learning experiences for women?** We broke the question down into a number of sub questions, including:

1. **Sociocultural context:** What past gendered interactions do women report that discouraged (or encouraged) them from learning to code? What do interactions look like in female-only coaching and learning groups? In what ways does a coaching and learning group support persistence? What social barriers and supports outside the group affect persistence?
2. **Personal context:** What are the characteristics and backgrounds of female administrators who seek out resources to teach themselves to code? What are the motivations for these women to teach themselves to code? What motivates them to seek out and join all-women coding groups?
3. **Physical context:** How are women learning to code both through written resources and in virtual, informal coaching and learning classes? What are the conceptual barriers and supports that they encounter, and what works for women in these classes to overcome barriers? What conceptual barriers and supports affect persistence?
4. **Persistence and identity:** In what ways does participating in a learning group with female coaching motivate (or not) women to persist in learning to code? How do their goals or reasons for learning to code change through their participation? How does their identity as a “coder” change or shift as they participate?

Research Method

Setting and Participants

The setting for this study was a virtual women's coaching and learning series of sessions held in 2017 (“CLG2017”). During this iteration, five groups were held simultaneously, with two coaches leading three to eight learners through the material in each group. Meetings were held for an hour and a half each week on the GoToMeeting platform, and coaches and learners—all volunteers—were located across the U.S. as well as internationally. Sessions consisted of coaches walking through explanations of coding concepts using a PowerPoint slide deck visible to learners and real-time coding examples written by the coaches. Learners asked questions and contributed answers to questions posed to the group by the coaches. They also completed practice homework readings and problems between class sessions and

posted their work on a CLG2017 forum. At the end of the 10-week series, learners completed a larger practice program, in pairs if they so chose.

Participants recruited for the qualitative part of this research study were enlisted from the set of learners participating in CLG2017. Information about the research project was given to all 25 learners—Salesforce administrators working for a wide variety of companies—and all 10 coaches through emailed flyers, postings on the community forum, mentions in the first class sessions, and virtual information meetings held by the researcher and the research assistant. Nine learners volunteered to participate in interviews, including five white women, two Asian American women, one Hispanic woman, and one African American woman, all but one of whom held a bachelor’s and/or master’s degree (see table below); all were located in the U.S. Four coaches—three women and one man, all white—and two organizers—both white women—also volunteered to be interviewed. Note that all names used in the table are participant-chosen pseudonyms.

Pseudonym	Age	Race/ Ethnicity	Highest Degree	Think-aloud participants
Hope	40	Hispanic	Bachelors	
Jane	33	White	Masters	*
Kate	54	White	Masters	*
Lila	28	Asian	Masters	*
Naomi	39	White	Masters	
Natalie	36	White	Bachelors	*
Rebecca	N/A	White	Bachelors	
Trinity	42	Black	High School	
Victoria	32	Asian	Bachelors	*

Data Collection

The methodological approach taken for the research study was an ethnographic one, and data collected include participant observation, interviews, forum postings, and think-alouds (see table below). The primary researcher was on the organizing committee of the CLG in 2015, but during the time of this study in 2017 she had resigned her role on the organizing committee and acted as participant observer in one of the groups. Her participation included attending weekly classes and participating in discussions as well as completing the weekly homework before the following class session. Class sessions lasted for 90 minutes and were audio- and video-recorded and transcribed for the researcher’s group. Field notes were taken and converted into text. Completed homework as well as questions and information posted by all participants on a community forum was captured and saved by the researchers.

The primary researcher collected all interview and think-aloud data. Semi-structured interviews, held at three timepoints (T1 at the start of the sessions, T2 at the end of the sessions, and T3 six months after the sessions ended; see Appendix A for protocols), lasted for about an hour and were audio recorded and were completed with all nine participating learners except for one T3 interview, due to a lack of response

from the participant. Think-alouds were held for one hour each week as five of the nine learner participants who had volunteered for this level of participation completed homework assignments over nine weeks; participants verbalized their thinking while working in Apex using the GoToMeeting platform while the researcher watched and listened, prompting the learner to continue to verbalize her thinking if she fell silent. Think-aloud sessions were audio and screen capture recorded. All interview and think-aloud sessions were transcribed for a word-for-word set of data.

Data source	Number	Length
Participant observation	10	90 minutes
Learner interviews	9 participants, 3 timepoints	60 minutes
Coach & organizer interviews	6 participants	60 minutes
Think-alouds	5 participants, 9 weeks	60 minutes
CLG forum postings	10 weeks	
CLG class sessions and materials (e.g. coach use of slides, homework assignment descriptions, resource materials)	10 weeks	

Research Findings

Sociocultural Context

Most participants in this study reported that they had experienced no past discouraging interactions attributable to gender. Those that did report gendered interactions in learn-to-code pathways cited the tendency of some males to shame “stupid” (novice) questions asked online, which inhibited the women from participating in Q & A forums to learn to code. After participation in the women’s Coaching and Learning Group, participants reported two supports to their learning that they attributed to the female makeup of the group: a comfort in asking questions and plentiful unsolicited verbal encouragement from coaches. In at least one case, this encouragement resulted in the participant’s persistence through to the end of the ten-week course. Participants reported no social barriers outside of the group; reported supports outside of the program included male partners and co-workers that encouraged learning and participation in the female-focused Coaching and Learning Group.

Personal Context

We found that the learners seeking out resources to teach themselves to code were generally college educated women who were motivated either by the desire to be able to read and understand the code written by hired developers or the desire to become developers themselves. The importance of a female-focused learning setting was mixed; while most women acknowledged a more comfortable atmosphere created by such a setting, very few cited that as a primary reason for joining the group. However, by the end of the 10 weeks of the program, two women admitted changing their opinions, finding that the female-focused nature of the group *had* made a difference in creating a more comfortable learning atmosphere.

Persistence and Identity

All learner participants in this study persisted through the ten weeks of the Women’s Coaching and Learning course, and reasons for learning stayed consistent. Participation beyond the course, however, varied, with most women discovering that they did not have the time or the motivation to continue to learn to code on their own with work and family obligations and without real-world, properly-sized problems for them to complete as they continued their learning. Many participants had taken on the identity of a “coder” through their participation in the Women’s Coaching and Learning Group, although a couple of the women qualified this by such terms as a “coder on hold.” Two of the nine learners that participated in this study successfully obtained Apex developer jobs after their participation and some continued learning and Salesforce certification.

Physical Context

Participants in this study reported a variety of resources used in the past to learn to code in Apex, including online tutorials, one-day classes sponsored by Salesforce, and meet-up groups focused on learning. They reported various difficulties in learning through these resources, including what they viewed as the gendered nature of classes where the men already seemed to know how to code—which set a fast pace for the class, difficulty in knowing “where to start” in their learning, and a lack of time to practice learning due to work and family responsibilities. The Coaching and Learning Group physical context encouraged learning and persistence by: curating learning resources so that they were targeted at the correct level for the novice learners, coaches giving real-world examples of how what was learned would be useful on the job, and creating a structured atmosphere similar to school though “homework” assignments that were posted on a social media platform visible to others when completed.

Research Conclusions

This study shows that organizers interested in forming women’s learn-to-code groups can effectively create a safe space for learners by intentionally forming norms and practices of the community to include unsolicited verbal encouragement and support and by fostering a value of no stupid questions. Within these groups, the challenges for organizers can include accommodating a variety of learning goals among subjects and to create learning experiences that are possible to productively insert into short chunks of time and that offer tools to and increasing expertise in applying foundational knowledge to specific business problems.

Findings here suggest that employers interested in supporting workers in transitioning to software development roles could assist by giving female novices verbal support and access to mentors who welcome any and all questions. Time to work on software development tasks and real-world business problems of manageable size for a novice would also boost learning.

This study illustrates that participation in women-focused organizations can lead to entry into software development jobs for some. For women unwilling or unable to complete postsecondary degrees in computing, such informal groups can be key to helping broaden participation in software development. With the chronic underrepresentation of women in computing at universities and colleges, we should be alert for successes in informal settings. In formal settings, faculty at postsecondary institutions may wish to use findings from studies such as this one to encourage increased participation of women in their classes, fostering a supportive atmosphere with learning approaches based on real-world business problems.

For researchers, next steps might include an investigation into crossings between formal, non-formal, and informal settings. Women in this study were assembling resources of many types to create learning opportunities for themselves in software development. Better understanding what resources they draw upon and how those can build upon one another would help us suggest effective pathways to computing not entirely focused on school settings.

Evaluation Results

Survey data was collected from all learners before the start of CLG17, each week of the class sessions, and at the end of the 10 weeks, and from coaches weekly, primarily for program evaluation and improvement purposes. A research assistant collected weekly survey data and gave the steering committee results from the survey for their future program planning. See Appendix B for survey questions. The data was summarized for the steering committee after the 10 weeks as shown here:

Survey response overview

Responses

Pre-survey	23 Learners
Weekly surveys	82 Learners
	55 Coaches
Post-survey	14 Learners

4 Total Withdrawals, 2 filled out survey

Demographics (collected on post-survey)

White/Caucasian	8
Asian	2
Hispanic	1
African American	1
Mixed race	2

Majority had Bachelor's degrees or higher and were married without children

Overall summary of feedback

Overwhelmingly positive feedback!

Throughout the course both coaches and learners (and this was reiterated in the post-course surveys as well) wanted examples to resemble real-world problems as where they felt many were very vague and not relatable.

The majority of people felt the pacing was 'just right'. One learner said 'too slow' in the post-survey, and only 3 out of 82 weekly submissions said 'too fast' during the course (week 1 and week 3).

Many people wanted more, optional homework that they could work through when they weren't solid on a topic.

Self-efficacy summary

- ⊗ The majority of scores remained similar or increased.
- ⊗ The single significant drop was on the question “I could complete my job using this software...if I had never used a package like it before.”
- ⊗ The highest scores on the pre-survey were on the questions:
 - “I could complete my job using this software...if I could call someone else using it before trying it myself.”
 - “I could complete my job using this software...if I had a lot of time to complete the job for which the software was provided.”
- ⊗ The highest score on the post-survey were on the question:
 - “I could complete my job using this software...if I had used similar packages before this one to do the same job.”

Pre-survey summary

- ⊗ Most learners came to the Coaching and Learning group through pre-existing networks.
- ⊗ Most learners joined because it fit their learning style and needs (small, supportive, female-focused, Salesforce focused).
- ⊗ Most learners had tried, in some capacity, to learn Apex before, but they were not at the professional functioning level they wanted to be.
- ⊗ A lack of time and a discouragement by not understanding were the greatest challenges cited.
- ⊗ All learners wanted to be able to troubleshoot existing code, most wanted to be able to identify solutions, and over 50% wanted to be able to write code. A way to increase confidence was cited by 82% as a reason to join the Coaching and Learning group.
- ⊗ Over 50% did NOT have a personal friend/mentor that could code.

Weekly survey summary

Learner Weekly Survey:

- ⊗ A disparity in skills/previous knowledge was clear from responses in early weeks (e.g. learners noted “this is moving too fast” OR “this is all review”)
- ⊗ Every week, coaching sessions were rated as most helpful and readings were scored second most helpful.
- ⊗ The highest confidence cited was in week one, dipping lower on week 2 and hitting an all-time low for weeks 3 & 4, increasing again in weeks 5, 6, and 7.
- ⊗ The biggest frustrations for learners were not enough time and difficulty understanding. Learners found week 3 very discouraging, although most of them returned to higher levels of confidence in subsequent weeks.
- ⊗ Breakthroughs cited were mostly an individual skill or a concept learned.
- ⊗ Learners were of the opinion that they should be able to choose whether to complete the final project alone or with a partner.
- ⊗ After a grueling week 3, week 4 was a nice respite. Week 5 was when people started putting everything together and many considered week 6 to be fun.

Coach Weekly Survey:

- ⊗ Most coaches’ concerns had to do with typos or broken links.
- ⊗ The second greatest concern was disparity in participation levels amongst individual learners, which usually mirrored their skill level.
- ⊗ Most coaches (from different sections) felt that blending demos and theory was more effective than separating them.
- ⊗ Abstract examples were difficult for everyone to understand, according to coaches.

- ⊗ Week 3 had too much content to cover, and it became very confusing. Week 4 allowed for some re-visiting/review, which was positive, but these weeks should be re-planning, according to coaches.
- ⊗ Week 5 was at a good pace.
- ⊗ Coaches found that this series of classes had great results and that the learners participated more fully than they had in previous sessions.

Post-survey results

- ⊗ Learners were very satisfied, and most were able to accomplish the goals they had set out for themselves.
- ⊗ The hours spent on homework per week were variable; most learners spent around 3 hours, and almost everyone was under 5 hours. One person spent 10-15 hours/week.
- ⊗ Learners noted that having two coaches that differed in experience was great, especially since learners could watch how they coded in different ways.
- ⊗ More, optional homework that they could work through if they were still unsure about a concept would be desirable, according to some learners.
- ⊗ Having continued access to resources, including organization of Chatter submissions, was helpful; learners could re-work the problems after a session has ended.
- ⊗ The most helpful aspect of the Coaching and Learning group cited by learners was the coaching sessions, and within the coaching sessions the most helpful aspect was the code demos.
- ⊗ The biggest barriers cited were time management, personal engagement and the organization of documents.
- ⊗ Most learners found the coaches phenomenal, while a few said they seemed too busy and not present enough on Chatter.
- ⊗ The majority of learners appreciated the all-female aspect of the group (they felt it to be freeing to not have to be careful of what they were saying), but most also thought that a mixed gender group would have been fine.
- ⊗ Everyone loved the size of each learning group, except one person wished it was bigger to include more opinions.

Appendix A: Interview Protocols

T1: At the start of the class sessions

1. What is your educational background? Have you taken any CS classes? Did you consider majoring in CS?
2. What type of company do you work for?
3. Tell me how you learned to work on the Salesforce platform. Did you receive help or encouragement from others?
4. Describe your interactions with the Salesforce community when you need to learn something in Salesforce.
5. Tell me about any database work you have done. Tell me about any coding you have done.
6. Tell me about the type of work you do currently using Salesforce.
7. How did you hear about the CLG17 women coders group?
8. Have you had any encouragement or discouragement from others to participate in CLG17?
9. What appealed to you about the CLG17 women coders group when you heard about it? (Did it make a difference to you that the group was all women?)
10. What do you hope to get out of your participation in CLG17?
11. What challenges do you expect to face during your participation in CLG17?
12. [How] is Apex necessary for what you are doing on the job? [How] will knowing how to code help you advance in your job?
13. Describe the process you go through when you want to learn something new.
14. Describe a time you have gotten stuck recently in using Salesforce. Describe what you did when you got stuck.
15. [Describe a time when you got stuck learning to code. Describe what you did when you got stuck.]

[after doing some coding/coding in Apex]

16. What do you find discouraging about learning to code?
17. Tell me about a triumphant moment when you were learning to code.
18. Which Apex concepts gave you the most trouble? Can you think of any way that you could have gotten help that would have made it easier for you to master the concept?
19. What concepts from Salesforce administration are similar in Apex?
20. Do you think that being a Salesforce admin gives you a leg up in learning to code? If so, how? What concepts are new in Apex?
21. Is there anything else you can tell me that would give me insight into what it is about the transition from admin to coder that is difficult?
22. Is there anything else you can think of that it might be interesting for me to know about being a woman teaching herself to code?

T2: At the end of the class sessions

1. Tell me about your experience in CLG17. (helpful? What it was like. Met goals? Felt part of a learning community?)
2. What did you like about your CLG17 group? Were there things that you thought could have been better? Did your CLG17 group feel like a cohesive learning community to you?
3. What type of person do you think would be the best fit for CLG17 group participation?
4. When we talked at the beginning of CLG17, you answered the question “what challenges to you expect to face during your participation in CLG17” by

- saying_____ Did you find that to be a challenge? What other challenges were there that you did not expect?
5. When we talked at the beginning of CLG17, you answered the question “what do you hope to get out of your participation in CLG17” by saying_____ Did you get that out of your participation? Did you get things out of your participation that you did not expect?
 6. Do you think that it made a difference that CLG17 is all women learners? Do you think that there would have been any differences if it was mixed-gender?
 7. How did participating in CLG17 compare to other times you have tried to learn to code in Apex, such as_____?
 8. What did your participation in CLG17 do to your confidence in your ability to learn to code in Apex?
 9. What topics covered in CLG17 do you think you will be able to implement in your Apex work?
 10. What Apex coding concepts were the most difficult for you to master during CLG17? Can you think of any way that you could have gotten help that would have made it easier for you to master the concept? What topics covered in CLG17 do you think you will have trouble implementing in your Apex work?
 11. What is the next step you are planning in learning to code in Apex?
 12. What do you find discouraging about learning to code?
 13. Tell me about a triumphant moment when you were learning to code.
 14. What concepts from Salesforce administration are similar in Apex?
 15. Do you think that being a Salesforce admin gives you a leg up in learning to code? If so, how? What concepts are new in Apex?
 16. Is there anything else you can tell me that would give me insight into what it is about the transition from admin to coder that is difficult?
 17. Is there anything else you can think of that it might be interesting for me to know about being a woman teaching herself to code?

T3: Six months after completion

1. Tell me about any changes to your job situation since CLG17.
2. Tell me how you use Salesforce now.
3. Tell me about any coding in Apex you have done since CLG17.
4. What resources have you used since CLG17 to learn more Apex? (e.g. classes, Trailhead)
5. Looking back, what did you find most useful about CLG17 compared to other ways you had tried to learn to code in Apex? What could have been more helpful? (e.g. covered material differently, things missing, intermediate CLG17 class?)
6. In what ways was what you learned in CLG17 useful for you on the job?
7. Would you call yourself an “admin”? Would you call yourself a “coder”? A “developer”? Why/why not? What do you think that a person needs to know or do to be a “coder” or a “developer”?
8. When you were doing CLG17 homework, what was the process you usually went through? What did you do first? (read, look for examples, tinker) Probe: Did your approach to writing Apex code change after CLG17?
9. What did you find most useful to completing the homework correctly?
10. What do you need now to learn more Apex?
11. Who can you ask now when you need Apex help? (look for: internal vs. CLG17)
12. Since CLG17, have you asked any Apex questions in any online communities? If so, have you had any experiences feeling supported or intimidated in mixed gender online groups?
13. Have you remained in contact with any of the CLG17 coaches or learners? Why/why not?
14. Are you more confident in writing Apex code since CLG17?

15. If you were to seek out another group to learn more Apex now, would you target an all-women's group? Why/why not?
16. If you are going to Dreamforce, what do you hope to accomplish there?

Appendix B: Surveys

Pre-survey

Name: [short answer]

How did you learn about the Women's Coaching and Learning group? [short answer]

What attracted you to the Women's Coaching and Learning group? [short answer]

I prefer to learn coding: [Within a group that only contains women learners/Within a group that contains a mixture of men and women/In any group; the group gender composition doesn't matter to me]

I am in the Women's Coaching and Learning group because Apex knowledge...(Mark all that apply): [is required for my work/helps to be able to get a promotion at work/helps to be able to take on new responsibilities at work/will increase my pay scale/improves my skills/is for personal enrichment/other]

I could complete my job using this software... [8 point Likert scale from "No, I couldn't do it" to "Yes, but not at all confident" to "Yes, moderately confident" to "Yes, I am confident"]

...if there was no one around to tell me what to do as I go.

...if I had never used a package like it before.

...if I had only the software manuals for reference.

...if I had seen someone else using it before trying it myself.

...if I could call someone for help if I got stuck.

...if someone else had helped me get started.

...if I had a lot of time to complete the job for which the software was provided.

...if I had just the built-in help facility for assistance.

...if someone showed me how to do it first.

...if I had used similar packages before this one to do the same job.

Generally speaking, when you are learning something technical what type of resources do you like to use? (Mark all that apply): [Use resources I find through a Google search/Take an online course or tutorial/Look at a book/Contact a specific person I already know/Post on a community forum/Other]

How has lack of Apex programming skills impacted you? (Mark all that apply): [Not a competitive candidate for certain job promotions/Would like a career change but don't have the skills necessary/Company loses money paying developers or contractors/I cannot troubleshoot all of my client's issues/My opinion gets ignored/Not able to communicate ideas with developers as well as I'd like to/Not able to complete all necessary work related assignments/No significant impact/Unsure/Other]

What strategies have you used to learn to code in Apex? (Mark all that apply): [I have not tried to learn Apex before/Reading blogs/Taking an in-person multi-day course/Online training/Watching videos/Attending a presentation/Attending a Dreamforce hands-on training (or Salesforce Elevate session)/Reading a physical book/Reading Salesforce documentation/Working through the Apex workbook/Completing Trailhead modules or projects/Other]

If applicable, please state the resource that you liked best and explain why.

If applicable, which challenges have you faced in learning to code? [I don't have time/I don't know where to start/I have tried, but I can't understand and I get discouraged/I have tried, but I have nowhere to go for help/I felt intimidated/I haven't experienced any challenges/Other]

If applicable, have you experienced any gender bias during your experiences in learning to code? [Yes/No/Not applicable/Other]

If yes, please explain. [short answer]

What do you hope to accomplish by the end of this course? (Mark all that apply) [To be able to read code/To be able to troubleshoot existing code/To know how to identify the best tool to solve problems/To be able to write triggers/To be able to write code others use/To have a developer framework/To have basic understanding of Apex/To have advanced understanding of Apex/To complete some type of certification process/To take on projects that I was previously unable to/To

increase my confidence/To participate in a community based forum/To increase my professional network/Other]

Do you have a mentor, friend, or family member that knows how to code? [Yes/No/Other]

If yes, please list your relationship and if you will be able to use this person as a resource when working on your Women's Coaching and Learning group homework.

What is your current job title? [short answer]

What proportion of your job relates to administering Salesforce? [100%/75-99%/50-74%/25-49%/0-24%]

What is the highest degree or level of school you have completed? [Less than a high school diploma/High school degree or equivalent/Some college, no degree/Associate degree/Bachelor's degree/Master's degree/Professional degree/Doctorate]

What is your age? [18-24 years old/25-34 years old/35-44 years old/45-54 years old/55-64 years old/65 years or older]

Do you care for any children who still live with you? [Yes/No]

How would you describe yourself? [Asian/Southeast Asian/Black or African American/Hispanic or Latino/Native American or American Indian/Native Hawaiian or Pacific Islander/Middle Eastern or North African/White or Caucasian]

Weekly Survey

Learners

Name: [short answer]

The pacing of the live content of the class today was: [too slow/just about right/too fast]

I learned the most this week from: [Readings/Exercises outside of class/Coaching session/Interaction with other learners on Chatter/Personal reflection/Trailhead units/Other]

I feel confident in my understanding of the coding tasks covered this week [strongly agree/agree/disagree/strongly disagree]

One key idea or concept I learned this week: [long answer]

I feel confident implementing in my work the coding tasks covered this week. [strongly agree/agree/disagree/strongly disagree]

My biggest frustration this week was: [long answer]

My greatest breakthrough this week was: [long answer]

Add additional comments, if any, here: [long answer]

Coaches

Name: [short answer]

If any learners were absent this week, please list them here: [long answer]

If any learners informed you that they will be dropping please list them here: [long answer]

Do you have any concerns pertaining to your learners? [long answer]

Please provide any feedback in regards to your class (subject matter, pacing, resources, etc.): [long answer]

Post-survey

Name: [short answer]

How many sessions did you attend? [0-5 weeks/6-7 weeks/8-9 weeks/10 weeks]

If you were unable to attend all of the sessions, what were your barriers for attending? [long answer]

How satisfied overall were you with this course? [5-point Likert scale: very dissatisfied to very satisfied]

What could have been done to improve your satisfaction? [long answer]

Overall, was the pacing of the course: [Too slow/Just about right/Too fast]

How many hours did you spend per week towards these classes? [short answer]

Were you able to accomplish the goals you had when you began this course? [Yes/No/Other]

Were there any coding concepts or topics you wish we had covered in this course?

[No/Yes/Other]

If yes, what concepts or topics? [short answer]

Concerning this Women's Coaching and Learning group course, what did you like about the classes? [long answer]

Concerning this Women's Coaching and Learning group course, what do you think could have been improved? [long answer]

During this course, at what points did you get stuck? [long answer]

When you got stuck on a concept, what resources were most helpful: [do a Google search/do an online course or tutorial/look at a book/contact a specific person I already know/post on a community forum/other]

Thinking about the course in general, please rank the following in terms of least to most helpful:

[7 point Likert scale]

Reading/blog posts

Coaching sessions

Discussion in Chatter group

Exercises outside of class (NOT Trailhead)

Trailhead units

Personal reflection

Final learner presentation

Thinking about the coaching sessions, please rank the following in terms of least to most helpful:

[7 point Likert scale]

Reflections on homework

Code demos

Group exercises

Interactions with coaches

Interactions with other learners

Reviewing coding concepts

What was the biggest barrier you experienced in this class? [long answer]

You were paired with a coach based on your time availability. Thinking about these coaches, did you feel mentored by them? [5 point Likert scale, strong disagree to strongly agree]

Please explain your response [long answer]

Did the female-only aspect of your fellow learners enhance your learning? Why or why not? [long answer]

Did you like the size of your class? Why or why not? [long answer]

I could complete my job using this software... [8 point Likert scale from "No, I couldn't do it" to "Yes, but not at all confident" to "Yes, moderately confident" to "Yes, I am confident"]

...if there was no one around to tell me what to do as I go.

...if I had never used a package like it before.

...if I had only the software manuals for reference.

...if I had seen someone else using it before trying it myself.

...if I could call someone for help if I got stuck.

...if someone else had helped me get started.

...if I had a lot of time to complete the job for which the software was provided.

...if I had just the built-in help facility for assistance.

...if someone showed me how to do it first.

...if I had used similar packages before this one to do the same job.