TABLE II: Codebook of the onboarding observation study showing excerpts of codes extracted from the transcribed data, with description and example codes.

Code(s)	Description	Examples
Self motivation	Participant who join the onboarding program are expected to be self-motivation; wiling to dedicate time for the two days training and to learn in a collaborative atmosphere.	$\boldsymbol{M_1}$: "Onboarding at OpenStack is an intensive program designed for newly graduated student in mind who are motivated and about to start their carrier in open source ecosystem such as OpenStack but lack the technical know-how." $\boldsymbol{TESTIMONY3}$:"… I found that being proactive and managing those expectations has worked the best for having successful mentor-mentee relationships."
Active communication	To participate in a large scale open source distributed Software development process, contributors should have a solid communication skill set	$\boldsymbol{M_1}$: "Moreover, M2 emphasized on IRC and the mailing list as the main communication Medium..." $\boldsymbol{TESTIMONY4}$: "I mean setting up goals even just as a mentee yourself and then again communicating those clearly to your mentor I think has been the best way for me to sort of track my progress and stay focused." $\boldsymbol{M_5}$: "… told participants to be consistent within and be on top of the reviewer's comments. Moreover, urge participants to be patient during the review period and be communicative and collaborative "Remember this is an open-source world! Things happen on the community schedule, not yours."
Collaboration Mentor-Mentee	Open source software development is a human centered activity that needs a great amount of collaboration especially in large ecosystems. Moreover, there are different types of collaboration which we observed. Mentor-mentee for example facilitates for knowledge transfer.	$\boldsymbol{TESTIMONY3}$: "I found that being proactive about that and managing those expectations has worked the best for having successful mentor-mentee relationships." "Active workplace mentoring helps mentees attain mature technical skills required to grow in their workplace, mentoring helps manage immature skill sets required to grow into a senior engineering role in the future"
Impostor Syndrome Effect	Joining/participating in a global team of diverse skills/talents can be challenging given that contributors are found different cultural background, educational setting, etc. However, it's important to understand this Effect to mitigate it.	$\boldsymbol{TESTIMONY3}$: "So, as a new developer fresh out of college coming into any new team can be very intimidating. [**deep silent** for a moment] Everyone around the kind of knows so much more than you and you feel that you're an imposter with so much to learn there's ..." $\boldsymbol{TESTIMONY7}$: "Active workplace mentoring helps mentees attain mature technical skills required to grow in their workplace, mentoring helps manage immature skill sets required to grow into a senior engineering role in the future. So, the maturation of those technical skills may also help alleviate impostor syndrome as most of us are likely familiar with."

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TABLE II – Continuation from the previous page.

Code(s)	Description	Examples
Ecosystem (SECO) specifics	Ecosystems are different from project, hence, there are different tools and processes that ecosystem use in software development and coordination that needs ecosystem wide concern to operate. For example, issues trackers.	M_1: “...Besides, in an ecosystem, the design paradigm is different and depends on domain knowledge. In addition, In an ecosystem, cross-project collaboration is the force that builds a community into an ecosystem but such is not the case with an individual project.” P_2: ... “Storyboard was engineered to support the coordination of cross-project work in an ecosystem setting, in which each project is different in the process of reporting bugs and planning new features, for example, a story could be to invent some new feature A, and tasks would be changed in project X, change in project Y, and change in project Z. Those changes need to merge in order to complete feature A.”
Ecosystem Best practices encouraged	Each ecosystem has sets of norms and practices that they encourage among different project teams. Some of these norms or practices encourages how to write write commits messages.coding style, or habits such as frequent testing.	M_2: “ You might have noticed that the feedback that mentors provided were actually the writing approach they expected you to write specifications and that is the best practice that we encourage.” P_3: “To check the differences between your branch and the repository: git diff master Assuming you have not added new files, you commit all your changes using: git commit -s -a Read the Summary of Git commit message structure for best practices on writing the commit message.”
Return on Investment (ROI)	Companies are involved in the running of OpenStack ecosystem, and some of these companies actually sponsor the onboarding events. Moreover, sponsoring companies will always want some benefits or return of their investment.	$TESTIMONY4$: “Mentoring is also a sound business investment. Teams and enterprises cannot afford to lose their top engineering talent as the needs of the business evolve, especially in industries where disruptive technologies result in an extremely competitive pool of talent.” FP_1: “However, the return of that investment can be very high. Investment in mentoring is key to staying competitive and keeping employees happy so in the long run yes mentoring can be an investment on behalf of you know the company but it pays out dividends later on.” P_5 “ ... really captured it. It’s the culture of the place that helps drive the behavior you want you can sort of sell it to leadership as it’s an investment and it’s it brings you business value and it helps retain talent because it keeps people happy and it increases skills that are hard to find in the marketplace”
Events	Ecosystems frequently organizes events to bring about contributors/organisations and different stakeholders to discuss and share common values.For example, Onboarding usually occurs during the main ecosystem summit.	M_1: “We strongly recommend the constant consultation of the online documentation as we ourselves are constantly referencing them throughout this training event. Read, read and Read your documentations.” M_7: “said ”After the 2-Days onboarding event, participants can sign up for a longer-term mentoring program to further strengthen their skills and become more productive and successful in the community. — That’s the way to transform learners into practitioners.”

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TABLE II – Continuation from the previous page.

Code(s)	Description	Examples
Code Quality/Guideline	It is important to write code that are robust and less buggy, thus improving code readability and testing.	M_1 " Hacking style guide was enforced by reviewers manually, but the process has been automated. Therefore, hacking makes code written by many different authors easier to read by making the style more uniform. (example: Unix vs. windows newlines)... " M_7 "Based on many years of practical experiences doing code development, bug troubleshooting and code review across OpenStack projects and other communities such as Linux kernel, CoreUtils, GNULIB, etc., we suggest a fairly common practice, which is motivated by OpenStack strong desire to improve the quality of it's projects' Git histories." M_1 "... to ensure high quality code, OpenStack recommends some syntax checks Frameworks such as: (eslint-config-openstack, Hacking, bashate, etc.), and enforces the OpenStack Coding standard."
Teams	Group of dedicated people that meets weekly and on other several occasions to discuss about specific project. Each project is run by a team.	$TESTIMONY2$ "So, contributing to an upstream project is so much more than just being added to a new team, there are now people all over the world that you have to deal with. It's a lot like having another person act as a mentor is like having an interpreter." $P33/35$: "P35 seated on table/group 10, were exchanging ideas constantly throughout this exercise 1, therefore, OB1 moved to table 10 and asked both P33 and P35 how they found the exercise and if they could walk him through the steps that they took in doing the exercise. P33 said "this was my first time working with git. At school, I did mostly theoretical computer science and mathematics, I know the logic and algorithm behind most code but have not been exposed to real situations. So it was."
Training programs	The onboarding process of OpenStack aim at improving productivity and quality code contributions.	M_1: "Onboarding at OpenStack is an intensive program designed for newly graduated student in mind who are motivated and about to start their carrier in open source ecosystem such as OpenStack but lack the technical know-how. We give them materials and hands-on training that equips them to master the tools, which they will use in making contributions to the codebase; add new features, fix-bugs, write documentation and participate in working groups to OpenStack as they join a community of thousands of developers from hundreds of companies worldwide." M_2:"The best way to maintain a healthy community is to educate newcomers and give them the tools they need to become effective contributors. One of ways OpenStack does this is through the two-day long Upstream Institute Training offered prior to each OpenStack Summit...."

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Code(s)	Description	Examples
Project(s)	These are individual units that forms the interdependent services in the ecosystem; OpenStack projects provides services to end-users.	M_2:“Project Onboarding gives participants a chance to meet some of the project team and get to know the project. Participants will learn about the project itself, the code structure/ overall architecture, etc, and places where contribution is needed. Participants will also get to know some of the core contributors and other established community members. Ideally, participants will know/ have completed the OUI basics”