The Open University

supported by National Cyber Security Centre

Security and Me

Instructions and Assessment

Security and Me is a questionnaire designed to help developers learn more about how they approach work and security. The answers to the questionnaire form an individual work profile. Through reflection and discussion, developers can associate aspects of their profile with a set of common security responses.

Instructions

- Print out a copy of the questionnaire for each participant
- Each participant should complete the questionnaire on their own (10 min.)
- Arrange for participants to work in pairs discussing their answers with one another (~15 min.)
- Optionally, discuss the outcomes as a group (20 min. or more)

Assessment

There are no "right" answers for any of the questions. The answers that are given should be assessed through reflection and discussion to associate personal attributes with security responses, and to consider both in the context of tasks that are being undertaken by teams or individuals.

By considering the elements of a person's individual work profile alongside activities and security responses, individuals and groups can identify areas for improving security practice. In the following section, points are given to support reflection and discussion.

Personal Profile

The questionnaire asks participants to consider four areas:

- The individual's sense of who and where they are in their career
- What energises or gets an individual down, in their daily work
- Particular details about work activities in the current job or employment

University of Exeter Lancaster University

Lopez, T., Weir, C., Tun, T., Cooper, H., Bandara, A., Levine, M., Nuseibeh, B. and Sharp, H. (2020) 'Security and Me', figshare [Online]. DOI: 10.21954/ou.rd.12213137.

Copyright © 2020 Open University. Reusable subject to the CC BY-SA 4.0 licence: https://creativecommons.org/licenses/by-sa/4.0/

- How the participant responds to security on the job

The answers to the questionnaire combine to form a profile that represents the person, illuminating the broad shape of their career, and perceptions about positive and negative work factors at a particular snapshot in time. The profile encapsulates:

A. ***Self-concept*** A picture a person forms about their working life. This perception develops over time within the course of multiple jobs. Studies within computing indicate that a developer's self-concept is comprised of many characteristics. The top five common characteristics of software engineers are: growth oriented, autonomous, socially connected, technically competent and job stability.

Questions for Reflection and Discussion:

- What are your characteristics as an engineer?
- Is one characteristic more important to you than the others?
- Are there any characteristics that are not in the top five?

B. ***Career stage*** There are a number of steps through which a developer progresses in the course of their career. Studies within software engineering suggest that different aspects of a developer's self-concept may be prominent at different stages of their career, and that a person's career stage moderates motivation on the job.

Questions for Reflection and Discussion:

- What kinds of activities do you take on at work at this point in your career?
- Are your work activities the same now as they were before?

C. ***Energisers/Energy Saps*** Aspects of software engineering as an occupation have been found to energise or to sap people's energy and enthusiasm. The most widely cited motivator in studies of software engineering is the ability to *identify with a task*.

Questions for Reflection and Discussion:

- Are your energisers/energy saps the same now as they were in the past?
- How do they correspond to your current tasks/project/role?
- How do they correspond to your security responses?

D. ***Work style*** Developers take distinctive approaches in how they write code, understand technologies, and the aspects of the work in which they take pride. The approaches are not mutually exclusive, nor are they tied to a particular career stage.

Questions for Reflection and Discussion:

- How does your work style "fit" with the project you are working on now?
- Has your work style changed over time?

Lopez, T., Weir, C., Tun, T., Cooper, H., Bandara, A., Levine, M., Nuseibeh, B. and Sharp, H. (2020) 'Security and Me', figshare [Online]. DOI: 10.21954/ou.rd.12213137.

Copyright © 2020 Open University. Reusable subject to the CC BY-SA 4.0 licence: https://creativecommons.org/licenses/by-sa/4.0/

E. ***Social engagement***. Software development practice is a social process. Our prior research has found that developers form and value connections made with other developers and communities.

Questions for Reflection and Discussion:

- What kinds of relationships do you have at work? Are these relationships the same as they were in other jobs/other stages in your career?
- When do you tend to connect with others?

F. ***Security Responses*** Tasks that involve security include authentication, network and application security, may span the entire development lifecycle, and involve the developer as both a user and a maker of software. Through our field studies, we have observed five common responses to tasks that involve security.

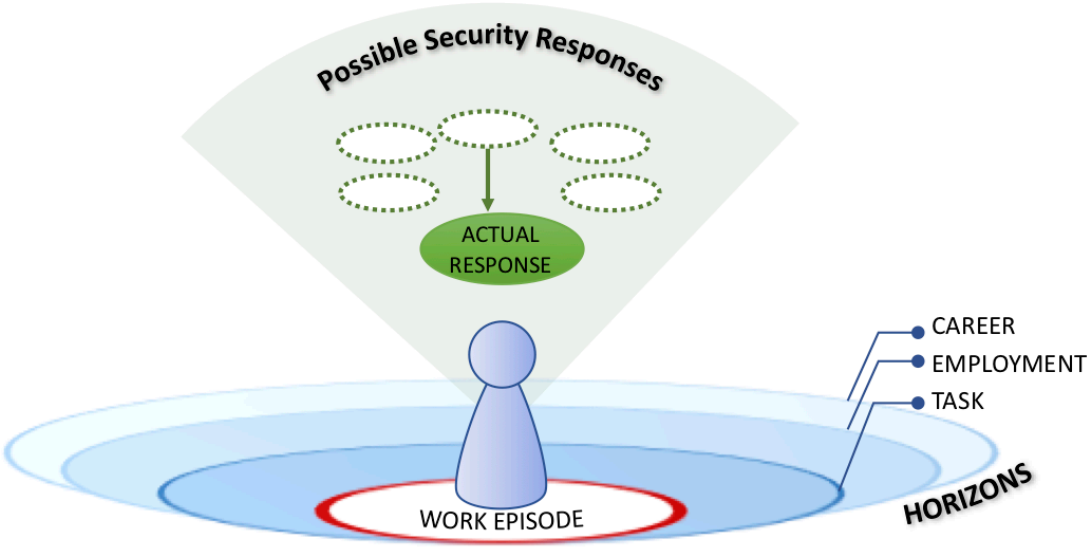

Figure 1. Security responses in context.

These responses are given within particular situations on the job, as shown in Figure 1. The responses have ties to an individual's sense of who they are in their professional life and the energisers and energy saps they feel at work.

Here are the five responses we observed:

Lopez, T., Weir, C., Tun, T., Cooper, H., Bandara, A., Levine, M., Nuseibeh, B. and Sharp, H. (2020) 'Security and Me', figshare [Online]. DOI: 10.21954/ou.rd.12213137.

Copyright © 2020 Open University. Reusable subject to the CC BY-SA 4.0 licence: https://creativecommons.org/licenses/by-sa/4.0/

1. *Worry:* Engaged, but not particularly active. A person who is worried may be aware that more could be done around security, or worried about the way things are being done, but doesn't necessarily have the ability (or perceive an ability) to act.
2. *Follow:* Not particularly engaged, this person follows signs in code about security, or prompts from others, or follows the policies set forth by the company. Many developers give this response, but care should be taken not to conflate this response with a lack of skill or experience.
3. *Explore:* Engaged, possibly active. This response is marked in people who demonstrate a high degree of interest in security. This person could have an active role in security activity at the company, or advocate for activity.
4. *Float:* This person seems to know something about a range of technical topics, including security. This person would not describe themselves as a security specialist, but can often be seen stepping in to help others solve problems that turn out to have a security aspect.
5. *Engineer:* Engaged, active and very capable. This response may be seen in a person who is a specialist or near specialist in some aspect of security.

To illustrate these points and to support your reflection and discussion, here are some examples of responses drawn out of our field studies. How do these examples relate to your own experiences and your own responses toward security?

- Three of the people who are working on project X indicate that they are concerned (Worry). What are we missing, not making time for, or not prioritising?
- There is a strong impulse by a junior engineer on Team B to explore security (Explore). He is particularly interested in cryptography. How could that help the team he is working on? Are there other teams in the department that would benefit from the understanding he has gained?
- B has a strong engineering focus to security (Engineer) but dislikes it when she doesn't have strong input on projects. She is the lead engineer on project Z, and the client for that project is not flexible; they expect the engineers to stay in their box. Is B able to contribute in ways that are meaningful on this project or do we need to make sure she gets a chance to apply her engineering focus somewhere else?

Further Reading

The questionnaire was developed using sources drawn from research within software engineering and a number of related fields. A few key sources are listed below, links to open-access copies of articles are provided where possible.

Amabile, T. M., & Kramer, S. J. (2007). Inner work life: understanding the subtext of business performance. *Harvard Business Review*, *85*(5), 72–83, 144. Available at:

Lopez, T., Weir, C., Tun, T., Cooper, H., Bandara, A., Levine, M., Nuseibeh, B. and Sharp, H. (2020) 'Security and Me', figshare [Online]. DOI: 10.21954/ou.rd.12213137.

Copyright © 2020 Open University. Reusable subject to the CC BY-SA 4.0 licence: https://creativecommons.org/licenses/by-sa/4.0/

https://hbr.org/2007/05/inner-work-life-understanding-the-subtext-of-business-performance

Clarke, S. (2007). What is an End User Software Engineer? In *Dagstuhl Seminar Proceedings*. Schloss Dagstuhl-Leibniz-Zentrum für Informatik. Available at: http://drops.dagstuhl.de/opus/volltexte/2007/1080/

Schein, E. H., & Van Maanen, J. (2013). *Career Anchors: The Changing Nature of Careers Self Assessment*. John Wiley & Sons. Available through Amazon.

Sharp, H., Baddoo, N., Beecham, S., Hall, T., & Robinson, H. (2009). Models of motivation in software engineering. *Information and Software Technology*, *51*(1), 219–233. Available at: http://oro.open.ac.uk/12948/

After the Workshop

Please would you help us develop these materials for you and others in future? You can help us by tweeting about your experience to @MotivatingJenny, and emailing us at motivatingjenny@open.ac.uk with quick answers to the following questions:

- How many people took part?
- What did you find worked well?
- What did you feel needed improvement?

Thank you very much for your help!

Lopez, T., Weir, C., Tun, T., Cooper, H., Bandara, A., Levine, M., Nuseibeh, B. and Sharp, H. (2020) 'Security and Me', figshare [Online]. DOI: 10.21954/ou.rd.12213137.

Copyright © 2020 Open University. Reusable subject to the CC BY-SA 4.0 licence: https://creativecommons.org/licenses/by-sa/4.0/