Reflection applied on Systems Architecting

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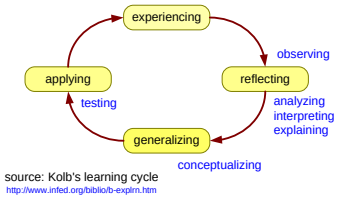

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This paper has been integrated in the book "Systems Architecting: A Business Perspective", http://www.gaudisite.nl/SABP.html, published by CRC Press in 2011.

Abstract

Reflection facilitates the learning process. We discuss a simple reflection model and provide some means for reflection.

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1 Learning and Reflection

Systems architecting is a competence that people mostly develop in practice based on experience. This book has brought you a lot of systems architecting knowledge and insights. Potential systems architects need to link the knowledge to their experience to develop the systems architecting competence.

Reflection facilitates learning by relating knowledge and experience, see Schön [3].

Reflection is an essential step of learning. Experiences are simply accumulating if no reflection is done. Reflection transforms experiences in insights and helps to develop capabilities. Reflection can be seen as an intelligent feedback mechanism applied on individuals.

Schön differentiates *Reflection In Action* (RIA) and *Reflection On Action* (ROA). Reflection In Action is reflecting concurrently with the action itself, while Reflection On Action is retrospective when the action has been finished. Note that *Reflection before Action* can also be quite useful: thinking about the approach and the expected reactions is valuable as preparation, but also sharpens the Reflections In and On Action.

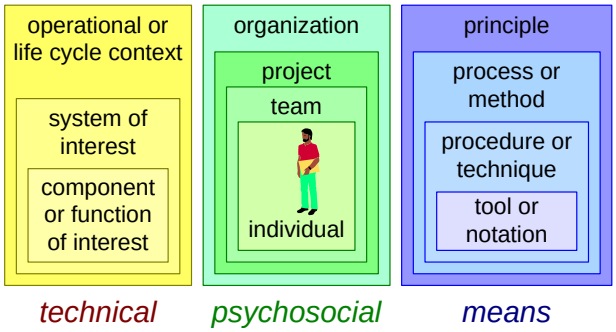

Figure 1: Examples of different scopes for reflection

Figure 1 shows several examples of the scope of reflection in the dimensions *technical*, *psycho-social* and *means*. The scope can be very specific (component or function, the individual, or a tool or notation). The scope can be increased, for example to look at the entire system of interest, or to also include the operational and life cycle context. Reflection in a narrow scope is more specific and more manageable. However, the impact of the reflection tends to be larger for larger scopes. We recommend to start small and specific and to gradually increase the scope of reflection.

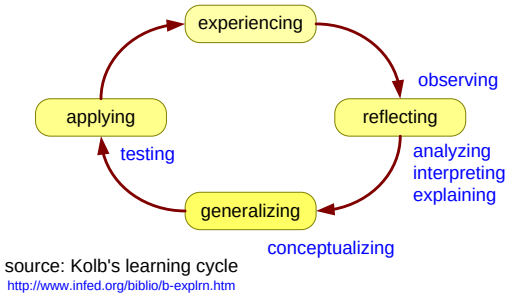

Figure 2: Reflection Cycle

2 How to Reflect?

We use the learning cycle as described by Kolb [1] to explain how to reflect, see Figure 2. Kolb's learning cycle is a simple model with 4 steps:

Experiencing specific situations in practice.

Reflecting on the experience. We can describe the situations based on observations. Next we can analyze what has happened, interpreting the observations. After analysis we can explain this specific situation.

Generalizing and conceptualization of this specific situation and previous experiences to achieve applicable insights for future use.

Applying the insights to test them in practice.

Someone who reflects steps out of a situation and tries to understand the situation by asking questions:

- What stakeholders are involved?
- What are their needs and concerns?
- What is our goal?
- How did we get in the current situation?
- What is going well, what is going bad?
- What approach can we take?
- What do we expect to happen?
- et cetera

3 Reflection Report

We encourage to follow the learning cycle logic when writing a reflection report. A reflection report could contain the following:

Subject or goal of the reflection report

Description of your experiences. Try to avoid interpretations in the description, limit yourself to observations (what did you see, hear, feel, et cetera).

Analysis of your experiences; can you understand and explain what happened?

Lessons Learned and insights obtained from the reflection.

Actions as follow-up: what are you going to do with your new insights?

Avoid broad generic statements in the report (e.g. "Everybody was complaining"), try instead to illustrate with specific examples.

4 Acknowledgments

Merete Faanes from Buskerud University College created the educational flow Reflective Practice. Reflective Practice is a thread throughout the entire master Systems Engineering to stimulate students to relate Education and Practice. Most work here is based on her ideas and knowledge.

References

[1] D. A. Kolb. *Experiential Learning*. Prentice Hall, Upper Saddle River, NJ, 1984.

[2] Gerrit Muller. The system architecture homepage. `http://www.gaudisite.nl/index.html`, 1999.

[3] D. Schön. *The Reflective Practitioner. How Professionals Think In Action*. Basic Books, New York, 1983.

History
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- Created, no changelog yet.