Considering Self-Efficacy in Reflection

Birgit Krogstie, John Krogstie

NTNU, Trondheim, Norway
John.krogstie@idi.ntnu.no

Abstract: There is a relationship between self-efficacy and the process of reflective learning. How they may influence each other can be explored by considering the steps in a reflective learning cycle. For each step, there are ways self-efficacy may be affected by how reflection is conducted, or may impact on how reflection should be conducted and supported. The paper outlines such connections, thus providing a starting point for further research on how to take self-efficacy into account when planning and designing for reflective learning and needed tool support for this.

1 Introduction

What are the consequences for learning and performance if Annie, a student of engineering, perceives her abilities in maths to be weak, sees tests as towering hurdles, bad results reflecting her lack of skills and good results surely being due to pure luck? What if Ethan the engineer perceives his good-but-not-excellent skills to be way above average, seeing little need to prepare much for challenging work tasks and considering whatever goes wrong as due to circumstances? What happens when these people reflect on their achievements? Should the initiation and guidance of reflective learning take such characteristics of the learner and work settings into account? We think yes. To argue for this, we need to take a step back and look further into the connection between reflective learning and Self-Efficacy (to be abbreviated as S-E).

Reflective learning can be considered as a *conscious re-evaluation of experience for the purpose of guiding future behavior*, with attention to feelings, ideas and behavior [1]. Reflection is regarded as essential for learning [2], [3]. In what follows, we use the term "reflection" and "reflective learning" interchangeably. Reflection can be individual, or it can be collective [4], involving the articulation and sharing of experiences and collaborative construction of knowledge (e.g. [5]). Reflection takes place in the workplace as well as in educational settings. We will in this paper refer to the activity reflected upon as "work", whether it refers to the everyday work of an employee or the learning activities undertaken by a student.

A factor that plays an important role in how the individual performs in her work (e.g. how tasks are viewed, whether they are taken on, how they are conducted, whether they are completed) is the *perceived S-E* of the person with regard to the various tasks. (We will from here on refer to "S-E", taking as implicit that it is as perceived by the individual). S-E is a construct originating in the social cognitive theory of Bandura [6]. S-E addresses the individual's belief in their ability to succeed with a task and relates this to the individual's experiences and interaction with others. e.g. learning from people who serve as role models. S-E may affect the choice about whether to engage in a task and whether to complete it. In the context of reflective learning, S-E thus plays a role in determining what kind of experience is generated

and how the individual further acts upon it. This points to S-E as relevant to those who wish to provide adequate support for reflective learning [7], including educators working with student-active approaches to learning (for instance self-directed learning [8] or problem based learning [9]) and to those developing tools supporting these activities.

Existing theory of reflection (e.g. [10]) and research addressing practical support for reflection in pedagogical contexts (e.g.[11], [12]) already relates to issues that form key elements of socio-cognitive theory. What we aim to do in this work-in-progress-paper is to systematically consider S-E in context of a reflective learning cycle, thus providing some anchor points for support (technological or other) for the reflective learner. It is important to stress that while this paper has a focus on the connection between reflection and S-E, the ultimate objective for continued research is to unveil ways in which adaptation and support (through technology or otherwise) may be introduced to improve the reflective learning process.

In the Background section, we provide a brief outline of the concept of S-E as well as a cyclic model of reflective learning (the CSRL model [7]). In section 3 we proceed to discuss how S-E potentially *impacts on* the steps and transitions in the reflective learning cycle. In section 4 we consider how S-E may *be affected by* steps in the reflection cycle. Section 5 concludes the paper with a discussion of issues to be addressed in further research along this vein, including some limitations and challenges.

2 Background

We here outline existing research on self-efficacy and the reflective learning process.

2.1 Self-Efficacy

At the core of the social cognitive theory [6] is the understanding that humans are agents deliberately using their actions to influence their own functioning and their surroundings. Influential factors in the self-regulation of human motivation and behaviour include not only S-E but also goal systems, outcome expectations, perceived environmental facilitators and enablers, and environmental impediments [13].

There are four main sources of S-E: mastery experience, social modelling (learning from role models), social persuasion, and physical and emotional states [14]. Mastery experience is regarded as the most significant among these. S-E can be measured with instruments adapted to the specific domain [19]. To get a measure of S-E, the individual is typically asked to rate a set of statements about their confidence (e.g. on a scale from 0% to 100%) that they will be able to perform the type of tasks in question. By measuring S-E, it is possible to compare within and across individuals how S-E develops over time and/or differs in a population.

According to Schwarzer and McAuley, the usefulness of S-E as an 'operative construct' relating to the self lies in its three components: competence (how behaviour is attributed internally), the temporal perspective (how future action is predicted) and behaviour (as opposed to attitudes or personal characteristics) [15].

An important point here is that S-E is not *fixed* – it develops over time as a consequence of the person's actions/experience as well as changing circumstances and requirements. Also, the relative importance of different areas of S-E for a person might vary over time (e.g. due to changes in roles/responsibilities). Thus, in measuring a person's S-E, we should not consider it as a trait revealed once-and-for-all, but rather as a measurable factor that can be used to gauge the current situation and that can be influenced by providing the right means. Thus self-efficacy might both vary over time and across different domains of knowledge.

There exists a significant body of empirical research establishing connections between S-E and other parameters of human behaviour such as performance. Generally, S-E has been found to influence performance in a positive way. Some studies have however found that increased S-E may have *adverse* effects on performance (for instance leading the individual to assume that less preparation is necessary to succeed with a task) [16]. Tierny and Farmer argue that the negative effect of high S-E on performance may be a characteristic of controlled laboratory settings, as opposed to more complex, real-life settings for which the threshold for a positive impact of S-E is higher [18]. Tierny and Farmer, for instance, conducted a longitudinal field study of creative S-E in a workplace, finding that by enhancing creative S-E, creative performance was also improved. Bandura, responding to studies showing null or negative effect of S-E on performance (e.g. [16]) points out that S-E is *one* factor within social cognitive theory and needs to be considered in context of the rest [13].

All in all, the body of research supporting a potentially positive influence of S-E on performance is substantial enough for us to make the basic assumption that increased S-E – or, sometimes, a more realistic S-E, may be favourable to performance.

Finally, it should be mentioned that we may talk about the *collective* efficacy of a group, which is bigger the more interdependent effort is required when a group undertakes a collective task [17]. Collective efficacy has relevance in the present context as both work and reflection may be collaborative.

2.2 The Reflective Learning Cycle

The process of reflective learning can be represented as a learning cycle as in the CSRL model of reflective learning [7]. The reflective learning as it evolves over time (e.g. in a workplace) can be considered as a set of interconnected reflection cycles, often involving more than one level in the organization. A key point of the CSRL model is that the steps of the reflective learning cycle may be supported by tools, which means the model can serve as a guide to the design and/or selection of appropriate technology to aid reflective learning. In this paper, we focus on the four main steps of the cycle and the transitions between them, considering implications for tool use as further work and as a main purpose of this work-in-progress.

The main steps of the CSRL model (see also Figure 1) are: Do and plan work – the activity in which experience is being generated; Initiate reflection – a spontaneous or planned, unstructured or systematic initiation of reflection based on data (formalized or not) about the work experience, resulting in a frame for the reflection (participants, resources, scope, objectives…); Conduct reflection session – engage in activities such as reconstructing experience, possibly sharing it with others, clarifying its meaning

(e.g. what are current challenges), finding solutions and creating an outcome; Apply outcome – implement the result of reflection as a tangible change to work or a changed readiness for action, or possibly initiate another round of reflection.

3 Considering the Impact of S-E on Reflection

A key point in this paper is that S-E plays a role in how reflective learning unfolds. We tentatively propose some ways in which transitions in the reflective learning cycle may be influenced by the S-E of the learner (summarized in Fig. 1):

Plan and do work – As described above, S-E influences performance, in particular decisions on what to do and how. It influences the shaping of the experience following from interpreting emotional reactions and from attending to aspects of the situation considered to be relevant, important and (maybe) within the learner's power of influence. S-E may also influence which data becomes available for reflection. The collective efficacy of a group working together may also be influencing on work activity and experience.

Initiate reflection - S-E influences what is perceived as a (reflection-triggering) discrepancy and what is worthwhile reflecting on (e.g. because it is within the learner's power of influence). This means there may also be an influence of S-E on the frame for reflection created at this stage: What is the scope, what are the relevant issues/constraints to consider, what are realistic objectives/types of outcomes, whom is it relevant/viable to involve (for co-reflection) etc.

Conduct reflection session – Again, considerations about what are possible solutions and viable options for bringing about change will be influenced by the individual's belief in her power to influence events. Also, especially in collaborative reflection, social learning mechanisms may play a part in determining who learns what from whom in the group. It is likely that participants will learn more from the experience shared by those considered similar to themselves (role models). Furthermore, considering the reflection session as an experience (in line with the work experience), S-E will impact on how this experience – of mastering an activity/process and contributing to its results – is shaped. If reflection is conducted in a group, the collective S-E of the group with respect to reflection as well as other collaborative work activity may impact on the reflection session. Participant's self-efficacy can influence the extent to which he or she contributes to the discussion.

Apply outcome – S-E may influence on the learner's decision to implement a change, as this may be a question of confidence that it will work out. Similar considerations apply to the decision to involve others. (Do I dare? Will it lead to anything?)

One issue in considering the impact of S-E in this process is whether attempts are made to *measure* the S-E and somehow use it to aid the process. In this case, a whole range of challenges arise along with the possibilities for useful insight. One question – on which we will not elaborate here - is the reliability and validity of measurement: is it S-E, and in the relevant area, that is being measured, and is the measurement reasonably accurate? Existing research (e.g. [19]) indicates that this can be adequately solved. Another question pertains to when measurement is being made, and whether it

is repeated (e.g. in a before-after research design). Furthermore, knowledge about the S-E of an individual may be available to the person, but also be made available to others, e.g. a manager, a teacher, peers, or some organizational intelligence system.

Knowledge about S-E in combination with other knowledge about the situation/activity could be used to aid decision on when it is useful/appropriate to reflect, with whom to reflect, and how (e.g. which questions might be addressed, which data should be available, which outcomes/types of outcomes to aim for, what to do with them…). As an example, it may be beneficial to individuals who are low on S-E to be paired with role models, both in work and in reflection sessions, to benefit from observational learning and vicarious experience.

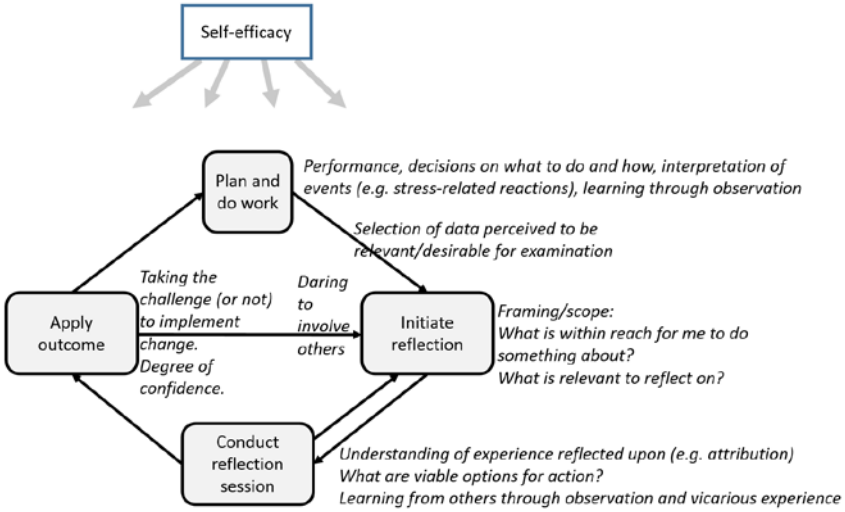

Fig. 1. Potential influence of S-E on the reflective learning cycle

4 Considering the Impact on S-E of Reflection

In looking for aspects of reflective learning influencing S-E, we may look for points in the reflective learning cycle likely to be influenced by mastery experience, learning from role models, social persuasion and interpretation of one's own emotional reactions. Each of these factors could in principle be relevant anywhere throughout the cycle through the *experience of reflective learning*. In particular, we should make sure to consider both the work experiences reflected upon and the experience of engaging in (and mastering) the process of reflection.

Ideally, the reflective learning process should build and strengthen the understanding that it is possible to reach insight about one's situation and do something about it.

We briefly indicate some ways each of the steps in the reflective learning cycle may impact on S-E:

Plan and do work – S-E may be influenced through mastery of work tasks, observational learning and social persuasion. This may also include collective efficacy.

Initiate reflection – S-E may be influenced through the experience of taking action to do something about issues at stake, possibly also by involving others.

Conduct reflection session – S-E can be affected by learning through vicarious work experience shared by role models, social persuasion, mastery of the reflection activity itself (conducting the session, seeing it resulting in outcomes), the use of insight on S-E (as measured and/or experienced) to identify action that will improve mastery. These points may apply also to collective efficacy.

Apply outcome – S-E can benefit (or suffer) from the experience of being able (or unable) to bring about change.

5 Discussion

We have given an outline of ways in which S-E may influence, and be influenced by, steps in the reflective learning process. Our intention with this paper is to argue for the potential of pursuing these connections in more detail through further research. Can the reflective learning cycle, appropriately supported, effectuate a virtuous cycle of increased S-E and increased work and/or learning performance? This question holds potential for being empirically explored as part of investigating actual reflective learning processes, for instance in a workplace or in a course in higher education.

We propose an agenda for further research along the following lines:

- Generally explore in more depth theoretically and empirically how S-E, as a measurable characteristic of a person in context of particular situations and tasks, can be taken into account in a way that aids the reflective learning process. This could mean tailoring the process to the individual, but also to consider the composition of teams (i.e. with regard to social learning) and collective efficacy.
- Apply research designs in which S-E is measured before and after a pedagogical intervention (e.g. introduction of a particular type of activity promoting active/reflective learning, and/or the use of technology support for reflection) to explore the possible impact on S-E. The connection between change in S-E and change in performance can also be explored, if relevant.
- Explore the effect of making S-E (measured or otherwise inferred) a topic of reflection, individually or through discussion with others. Questions in an S-E scale may serve the simultaneous purpose as trigger and guidance of reflection.
- Use current insights on technology support for reflection (e.g. from the MIRROR project [7]) to see how the above can be aided by computerized tools. In addition to building upon work in the TEL area, insight from Learning Analytics (LA) such as [20] might also be beneficial here.

References

1. Boud, D., Keogh, R., Walker, D.: Reflection: Turning Experience into Learning. RoutledgeFalmer (1985)
2. Dewey, J.: How we think. A restatement of the relation of reflective thinking to the educative process, (Revised edtn.). Boston: D. C. Heath (1933)

3. Kolb, D. A.: Experiential learning: Experience as a source of learning and development. New Jersey: Prentice Hall (1984)
4. Prilla, M., Pammer, V., Krogstie, B.: Fostering Collaborative Redesign of Work Practice: Challenges for Tools Supporting Reflection at Work, presented on European Conference on Computer Supported Cooperative Work (ECSCW) (2013)
5. Stahl, G.: Building collaborative knowing, in What We Know about CSCL and Implementing it in Higher Education, J.-W. Strijbos, P. A. Kirschner, and R. L. Martens, Red. Boston: Kluwer Academic Publishers, 53–85 (2002)
6. Bandura, A.; Social cognitive theory of human development, in International Encyclopedia of Education, 2nd edition., T. Husen og T. N. Postlethwaite, Red. Pergamon Press, (1996)
7. Krogstie, B., Prilla, M., Pammer, V.: Understanding and Supporting Reflective Learning Processes in the Workplace: The CSRL Model, in Scaling up Learning for Sustained Impact, bd. 8059, Springer, 151–164 (2013)
8. Brookfield, S.D.: Self-Directed Learning», i International Handbook of Education for the Changing World of Work, Maclean, R. og Wilson, D., Red. Springer Science+Business Media (2009)
9. Savery, J. R., Duffy, T. M.: Problem Based Learning: An instructional model and its constructivist framework, Educ. Technol., no. 35, 31–38 (1995)
10. Boud, D., Keogh, R., Walker, D.: Promoting Reflection in Learning: a Model, in Reflection: Turning Experience into Learning, D. Boud, R. Keogh, og D. Walker, Red. RoutledgeFalmer, 18–40 (1985)
11. McCarthy, T.: Levels of reflection: The mirror, the microscope, and the binoculars, Int. J. Self-Dir. Learn., bd. 10, nr. 1 (2013)
12. Moon, J. A.: Reflection in Learning and Professional Development: Theory and Practice. London: Kogan Page (1999)
13. Bandura, A.: On the Functional Properties of Perceived Self-Efficacy Revisited, J. Manag., bd. 38, jan. (2012)
14. Bandura, A.: Self-Efficacy, in Encyclopedia of human behaviour, bd. 4, V. S. Ramachaudran, Red. New York, USA: Academic Press, 71–81 (1994)
15. Schwarzer, R., McAuley, E.: The world is confounded: a comment on Williams and Rhodes (2016), Health Psychol. Rev., bd. 10, no. 2 (2016)
16. Vancouver, J. B., Thompson, C. M., Tischner, E. C., Putka, D. J.: Two Studies Examining the Negative Effect of Self-Efficacy on Performance, J. Appl. Psychol., bd. 87, no. 3, 506–516 (2002)
17. Stajkovic, A.D., Lee, D. Nyberg, A.J.: Collective efficacy, group potency, and group performance: meta-analyses of their relationships, and test of a mediation model. J. Appl. Psychol. Vol.94 no 3, s.814-28 (2009)
18. Tierney, P., Farmer, S.M.: Creative Self-Efficacy Development and Creative Performance Over Time, J. Appl. Psychol., bd. 96, no. 2, 277–293 (2011)
19. Bandura, A.: Guide for constructing S-E scales, in Self-Efficacy Beliefs of Adolescents, Pajares, Frank og Urdan, Timothy C., (Eds). Information Age Publishing (2006)
20. Verbert, K., Govarts, S.,Duval,, E., Santos, J.L., van Assche, F., Parra, G.,Klerks, J.: Learning dashboards: An Overview and Future Research Opportunities. Pers Ubiquit Comput (2014) 18:1499-1514