



Reflection as a core student learning activity in higher education - Insights from nearly two decades of academic development

Sven Veine, Martha Kalvig Anderson, Nina Haugland Andersen, Thomas Christian Espenes, Tove Bredesen Søyland, Patric Wallin & Jonathan Reams

To cite this article: Sven Veine, Martha Kalvig Anderson, Nina Haugland Andersen, Thomas Christian Espenes, Tove Bredesen Søyland, Patric Wallin & Jonathan Reams (2019): Reflection as a core student learning activity in higher education - Insights from nearly two decades of academic development, International Journal for Academic Development, DOI: [10.1080/1360144X.2019.1659797](https://doi.org/10.1080/1360144X.2019.1659797)

To link to this article: <https://doi.org/10.1080/1360144X.2019.1659797>



© 2019 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 19 Sep 2019.



[Submit your article to this journal](#)



Article views: 84



[View related articles](#)



[View Crossmark data](#)

Reflection as a core student learning activity in higher education - Insights from nearly two decades of academic development

Sven Veine ^a, Martha Kalvig Anderson ^a, Nina Haugland Andersen ^a, Thomas Christian Espenes ^a, Tove Bredesen Søyland ^a, Patric Wallin ^b and Jonathan Reams ^b

^aDepartment of Industrial Economics and Technology Management, Experts in Teamwork academic section, Norwegian University of Science and Technology (NTNU), Trondheim, Norway; ^bDepartment of Education and Lifelong Learning, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

ABSTRACT

Experiential learning (EL) has great potential to prepare students to work on interdisciplinary and global challenges across traditional boundaries, as well as support them in the development of reflective skills. In this study, we explore reflection as a central element for EL in the university wide interdisciplinary course Experts in Teamwork (EiT). Based upon 17 years of experience with the development of EiT, perspectives from the literature, and critically analyzing current practices, we describe two key findings from this ongoing exploration: the need to develop a framework for such a course and the need for training of teaching staff.

ARTICLE HISTORY

Received 13 June 2018
Accepted 22 April 2019

KEYWORDS

Academic development;
experiential learning;
interdisciplinary; reflection;
team-based learning

Introduction

Today's higher education aims to prepare students for solving tomorrow's problems, sometimes without knowing what these problems will be (Fabríz, Dignath-van Ewijk, Van Poarch, & Büttner, 2014). In this context, it is recognized that the bigger challenges that the world faces, such as those described in the UN's 17 Sustainable Development Goals (www.un.org/sustainabledevelopment/), can most often only be solved using interdisciplinary and global approaches (Jacob, 2015). Higher education institutions need to create opportunities for students to work across disciplinary and cultural boundaries and learn from those experiences. Experiential learning (EL) offers an interesting point of departure to achieve these goals (Coulson & Harvey, 2013). It describes learning as 'the process whereby knowledge is created through the transformation of experience' (Kolb, 1984, p. 38) and emphasizes reflection as an integral part of learning activities. Through reflecting on their own behaviors and approaches (Spelt, Biemans, Tobi, Luning, & Mulder, 2009), students from different disciplines contribute

to their interdisciplinary teams and become actors with the potential to solve tomorrow's challenges (Fabriz et al., 2014; Jonassen, Strobel, & Lee, 2006).

There is a growing interest in higher education in reflection and different ways to promote reflection in EL have been proposed, e.g. reflective journals, reflective pre-assessments, and reflective post-assessments (Tanner, 2012). However, there is still a lack of contextualized examples from interdisciplinary courses, as well as practical guidance for educators and academic developers about how to conceptualize reflection and support the development of reflective capacity in students (Mann, Gordon, & MacLeod, 2009).

In this study, we describe and explore reflection as a central element for EL in a university wide interdisciplinary course (around 2300 students, 85 teachers and 170 learning assistants). Based upon 17 years of experience with the development of the course, Experts in Teamwork (EiT), reconsidering the experiences through the perspective from the literature, and critically analyzing current practices and teaching materials used in the course, we address the issue of how to establish a focus on reflection in learning. This article describes two key findings from this ongoing exploration: the need to develop an adequate framework for such a course and the need for relevant training for teaching staff. On a meta level, we think that the EiT example provides an interesting twist on academic development by giving teachers the possibility to experience new teaching and learning approaches by teaching a course under the EiT umbrella.

Background on reflection for learning

Reflection and learning are deeply intertwined with each other and reflections are central in integrating theoretical and practical competencies, as well as to raise awareness around implicit assumptions (Mezirow, 1997; Schön, 1983). In practice, students will face several situations that are unclear, confusing, complex, and unstable; the outcome may be highly uncertain, and the goals may be conflicting. Such situations demand a reflective approach. This situational complexity also emerges in the way that Moon (1999) describes reflection as a mental processing method: 'reflection seems to be a form of mental processing with a purpose and/or an anticipated outcome that is applied to relatively complicated or unstructured ideas for which there is not an obvious solution' (p. 98).

Building upon a constructivist perspective on learning, the emphasis in EL is moved towards students' construction and co-construction of knowledge (Christie & de Graaff, 2017). It is during the actual process of relating specific situations and evaluations from different perspectives to more abstract conceptualizations that meaning is constructed and learning takes place (Biggs, 2012). In more general terms, reflection is important for interpreting and internalizing academic activity (Karm, 2010), and it serves as a way of questioning and sharing underlying assumptions, and improving team performance (Gordijn, Eernstman, Helder, & Brouwer, 2018).

One way to conceptually link reflection and learning was proposed by Kolb (1984), who developed a four-stage experiential learning cycle. In the first stage, students have a concrete experience that they reflect upon in the second stage. This is followed by the third stage, where students transform their experience and reflections and build or

modify their abstract conceptualizations. In other words, they learn from their experience. Finally, students use and apply these concepts in other situations and gain new experiences that start the next learning cycle. In a similar way, but with a stronger focus on the actual activities during stage two and three, Boud, Keogh, and Walker (1985) outlined three actions necessary to enable learning from experience. The first action involves reliving the situation as experienced, preferably by writing it down, without considering or evaluating it. The second action is to pay attention to the feelings that may arise when reliving the experience. The third action is to re-evaluate the experience, see it in the context of previous experiences, integrate new insights, test it in different ways, and make it their own. By inviting the whole human being into the learning situation, students' emotions, experiences, and frames of reference all play a role in their encounter with the content of learning (Coulson & Harvey, 2013).

In order to move beyond reflecting on only personal experiences, it is important to challenge underlying assumptions and beliefs, Brookfield (2017) proposed four different lenses that can stimulate more critical reflections: 1) the autobiographical lens, 2) the peer lens, 3) the student lens, and 4) the scholarship lens. Through these different lenses, a person can approach concrete experiences from different directions and gain a better overall understanding.

In EL, teachers may support the acquisition of reflective skills by applying strategic teaching interventions, aiming at scaffolding skills relevant to students' current learning phase (Coulson & Harvey, 2013). It is important to keep in mind that reflection is not something that students engage in automatically, and they need help and support (Wedelin & Adawi, 2014). Several factors may influence students' need for such support, including previous experience with reflection from other courses, potential language barriers, and cultural differences in the conceptual understanding of reflection (Moon, 2004).

Overall, a wealth of academic literature shows that learning can be reinforced through reflective activities for students (e.g. Harvey, Coulson, & McMaugh, 2016; Moon, 2004; Schön, 1983). One of the most common tools to promote reflection in education are reflection journals, also referred to as reflective diaries or learning logs (Moon, 2004). Students are asked to write down events they have experienced, what it meant or means for them, and what they might have learned from it. The journals act as containers for writing that provide students with a framework to structure and remember their thoughts and reflections. The level of structure can vary, and journals can be either prompted, where students are provided with specific themes or questions to reflect upon, or unprompted, where students reflect on topics they consider important (Wallin & Adawi, 2018a, 2018b).

One known challenge with reflection journals is students' unfamiliarity with reflective writing (Tanner, 2012). Especially in the beginning, students often tend to be superficial and merely descriptive in their reflections (Hatton & Smith, 1995). This challenge is emphasized in interdisciplinary settings, as students have been exposed to varying degrees of reflection and might not directly see the value in reflective practices (Dyment & O'Connell, 2010). Due to a limited interchange between disciplines, it is challenging to overcome this variation and promote reflection as a core learning activity across an entire higher education institution. In fields such as mathematics, science, and engineering, reflective thinking is often not visible and highlighted, but instead a strong

emphasis is placed on facts, principles, and procedures presented in a dualistic mode (Felder & Brent, 2004; Wankat, 2002). It is therefore important to support students and carefully introduce reflection journals into their learning strategies through clear guidance and activities integrated into the course (Moon, 1999), as well as to ensure constructive alignment between reflection activities, assessment practices, and learning outcomes (Harvey, Coulson, Mackaway, & Winchester-Seeto, 2010).

The Experts in Teamwork case

This study centers on Experts in Teamwork (EiT), a 7.5 ECTS (European Credit Transfer and Accumulation System), interdisciplinary course at the Norwegian University of Science and Technology (NTNU) in Norway (Sortland, 2006; Wallin, Lyng, Sortland, & Veine, 2017). EiT is mandatory for most master's level students at the university meaning that students from all professions and disciplines, as well as from different cultures, take the course. EiT, as a university wide interdisciplinary course (2300 students in 2018), offers an interesting departure point for discussing ways to use reflection as an active form of learning for students on a large scale and to study phenomena coupled to reflection and reflective writing.

The purpose of the EiT course is to increase students' ability to contribute constructively to interdisciplinary teams and to develop collaborative skills needed for later work life. From a pedagogical standpoint, the course builds upon an EL cycle (Kolb, 1984) with four phases: 1) Students gain direct experiences in teamwork that they 2) reflect on, individually and together. 3) The students are expected to gain a deeper understanding of their own processes, experiences, and reflections by looking at relevant theoretical concepts. 4) The students will then use this as a basis for designing and implementing new actions, as part of the development of their interdisciplinary team dynamics. In this way, EiT intends to give students a practical and realistic arena for training and acquiring interdisciplinary teamwork skills.

In the EiT course, students from all faculties are grouped across academic backgrounds and in some cases across nationalities. Students choose a village, a class of 25–30 students with an overarching theme which they are interested in. In 2018, 78 villages were offered by teachers coming from all different disciplines, covering themes like: 'Biofuels – a solution or a problem', 'Active retirement', and 'Soft technologies'. On a more general level, the aim is to establish closer links between the university and society and highlights NTNU's role as a relevant actor in society – nationally and internationally.

In the village, students are divided into teams of 5–7 people, where the team itself defines their own project within the general theme of the village, based on the expertise that each student contributes to the team. The team then works with its chosen project, mainly independently, aiming to make use of their interdisciplinary potential, and progressing through the first phase of the experiential learning cycle. The EiT course takes 15 full days, either in an intensive period within three weeks or over the whole semester every Wednesday.

In addition to a teacher (or in EiT terms, village leader), each village has two learning assistants that facilitate the teams. These are students employed on a part-time basis with training in observation and facilitation. The learning assistants' role is to initiate reflections, highlighting aspects of the team dynamics that may be less evident to the

team itself, thus giving the team an opportunity to discuss and become aware of previously hidden dynamics.

Academic development to promote reflection in EiT

The development of EiT came in response to a call to increase the quality of higher education in Norway, issued by the Norwegian Ministry of Education in the 1990s. In particular, the industry called for engineers with communicative and social skills in addition to their acquired discipline-specific knowledge (Hovdhaugen & Aamodt, 2005). In order to be able to meet the ill-structured dilemmas and multifaceted problems of today's society, the students needed training in teamwork. EiT was initially established mainly for engineering students in 2001. However, the University board soon decided that EiT should be mandatory for all master's students across disciplines at NTNU. When EiT was created, there was no similar course or framework that could be used as a template and the academic developers involved in the project started by testing, evaluating, and reflecting upon different approaches to continuously develop the framework (Helgesen, Slåtten, Sortland & Vikjord, 2009). It took several years of planning and gradual implementation before almost every master's program included EiT in the 8th semester by 2007.

Already in 2005, a report from an independent research institute (Hovdhaugen & Aamodt, 2005) concluded that: 'EiT thus succeeds in giving the students more of what is often termed "generic" knowledge, i.e. knowledge that is common to all disciplines, and especially in the field of "socio-communicative skills"' (our translation, p. 49). In the following decade, student surveys showed a steady increase in general satisfaction with the course (Figure 1). In addition, the EiT section receives regular feedback from

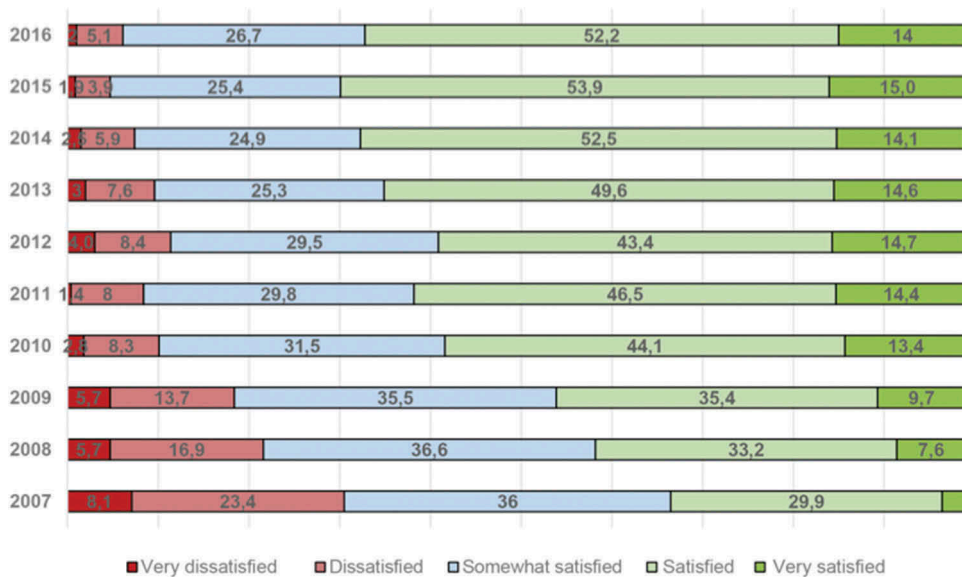


Figure 1. Students' overall satisfaction with the EiT course 2007–2016.

the private and public sector that shows that EiT contributes to students' development of competencies that are valued (Sortland, 2015).

Today, EiT has fourteen academic developers that are responsible for continuous development of the overarching framework and educational materials for the course, as well as for training and follow-up of the teaching staff (including teachers and learning assistants). The EiT section receives annual feedback from the teaching staff in the course by organizing open meetings for exchanges of experience and regular evaluation meetings, and students evaluate the course by answering a questionnaire at the end of the semester. Furthermore, the academic developers visit many villages during the semester to observe how teaching staff and students interact, to gain better insights into the multifaceted realities of EiT. There have also been several master's thesis projects that focus on different aspects of the EiT framework and studied it from a variety of perspectives.

Based on this information and findings, persistent efforts have been made to develop and improve the learning materials, the facilitation, and the syllabus of the course, to support students' learning through reflection. In a different strand of research, the Computerized Lectical Assessment System was recently used to map levels of reflective judgment skills in EiT (Wallin, Reams, Veine, & Anderson, 2018) and this information will be used in the future as a starting point to develop more personalized support tools for students to learn reflective skills in EiT. Overall, the EiT Section works continuously to promote reflection in EiT, through ongoing development and influence in two main areas: 1) the framework of EiT that provides a structure for the reflection activities, and links them to learning outcomes and assessment practices; and 2) training and supporting EiT teaching staff.

The framework of EiT

The EiT Section develops and defines the overall framework and syllabus for the EiT course that all villages need to be built around. Within this framework, EL and reflection are two core elements and there is a strong emphasis that students in all teams reflect together on their own teamwork experiences throughout the course. Reflective activities are integrated throughout the course and time is specifically allocated for these activities (Quinton & Smallbone, 2010). This helps the students get into the habit of reflecting and ensures that important thoughts and reflections are preserved and not forgotten. The EiT course uses different activities and approaches to promote students' reflective capacity, which are conceptually integrated and structured through a reflection pyramid. The reflection pyramid (Figure 2) illustrates that reflection takes place at various levels: the individual level and the team level, as well as on a meta level over time. Each of these levels is promoted through different activities and approaches, and constructive alignment between activities, assessment, and learning outcomes is ensured through a holistic approach to reflection.

Personal reflections

On the first level in the reflection pyramid are students' personal reflections on teamwork situations, corresponding to Brookfield's lens of reflection on one's own experience (Brookfield, 2017). To support their personal reflections, each student receives

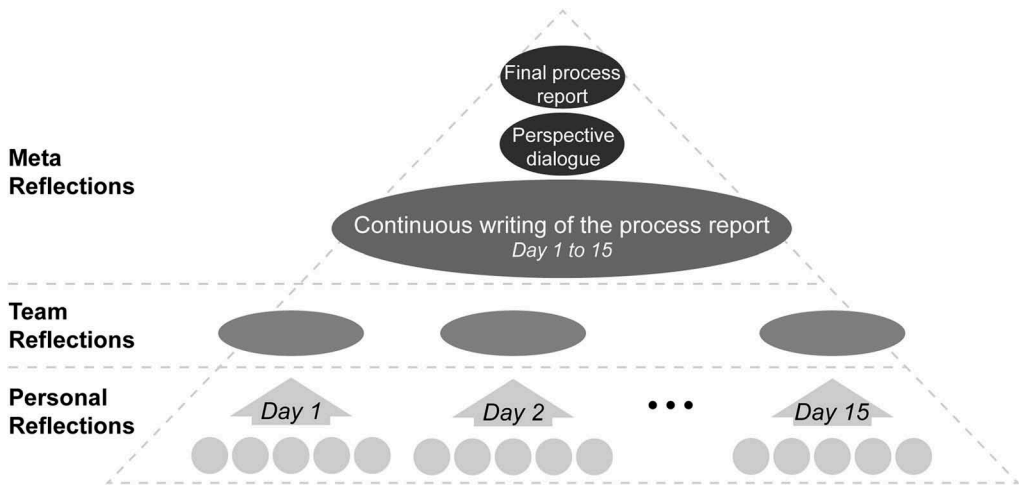


Figure 2. Experts in Teamwork reflection pyramid.

a reflection journal (Sortland, 2018b) which includes information about the EiT framework and blank pages for reflective writing. The students are encouraged to describe events (experiences) and their reflections upon these events, which corresponds to the first and second phase of the experiential learning cycle (Kolb, 1984).

Besides the practical aspects of providing students with reflection books, three scaffolding approaches are used to facilitate student reflections. First of all, students need to feel safe about writing down how they perceive themselves and others (Stocks & Trevitt, 2016). Secondly, it is necessary to help students understand the value of reflecting on their own interaction and group processes. A key aspect here is to make teachers aware of their own conceptualization and communication of reflection as an important part of all learning activities during the training (Moon, 2004). Thirdly, to deepen their reflections, the activities should be repeated several times during the course. In the EiT course, students are encouraged and reminded to reflect throughout each course day and time is specifically reserved for reflective activities. It is this iteration of the reflective activities that will help the students make progress in deepening their reflections (Grossman, 2009).

Team reflections

On the team reflection level, group members share and discuss their personal reflections and evaluations. This involves becoming aware of the team's patterns in decision-making, participation, conflict resolution, information sharing, taking care of their well-being and motivation, amongst other things. In order to be able to do this, it is important that both the village leader and learning assistants create a safe space for learning, where sharing reflections within a team is possible. When students share their individual reflections in the team, each team member's experience and understanding of the same situation and/or team member's behavior is made visible. By adding the different perspectives, students will be able to reveal assumptions, expand their understanding of their own actions and discover behaviors that are not visible to the

individual (Brookfield, 2017). They build on each other's perspectives and give feedback to individual team members and the team as a whole (Holen, 2000).

In addition, learning assistants share their external perspective in the form of descriptive observations and through open questions, thus inviting the student teams to include an external perspective in their reflections. In this way, Brookfield's third lens for reflection is conceptualized more broadly as the complementary part in a learning situation, and perspectives from teachers and learning assistants are used with this purpose in EiT. In the EiT context, special attention is paid to maintain students' ownership of and responsibility for the team's challenges as well as successes. Through this approach, students remain in control and perceive themselves as important actors with influence (Fabrizz et al., 2014; Jonassen et al., 2006).

The team members reflect on the different perspectives that emerge and on aspects of their teamwork that become visible to them. Teams then explore and decide on actions that they can take in order to improve their cooperation and make better use of their productive potentials in the project work. In order to make these processes visible and available for meta reflections later on, both the individual perspectives and the team's shared reflections and considerations are written down in a team reflection document. The students are also provided with different tools that are especially well suited to exploring a team's reflections in greater depth, so that these are less likely to be superficial and descriptive (Hatton & Smith, 1995; Moon, 2004). One example is the SITRA exercise (Sortland, 2018a) that helps students to analyze their team reflections by graphically identifying different types of text elements: Situation, Theory, Reflection and Action. Each of the four elements in the model reflects the stages in the EL cycle. SITRA is an analysis tool that visualizes the extent to which the various components emerge in the team's shared reflections and helps to raise students' awareness about the type and depth of their reflections.

Meta reflections

On the meta level, teams reflect upon their experiences and previous reflections by setting situations into a temporal context. Through these meta reflections, teams have the opportunity to approach their development over time and learn from the underlying process, as outlined in phases 3 and 4 of the experiential learning cycle (Kolb, 1984). Two EiT activities in particular facilitate reflection on the team's cooperation during the project work: The perspective dialogue (a dialogue between the teaching staff and student team in the concluding stage) and the process report.

During the perspective dialogue, the teaching staff and student team reflect together on the team's development and learning over time, based on previous team reflections and observations throughout the course. By engaging in dialogue with the students, the teaching staff can stimulate memories and reflections on experiences and help the students to make deeper reflections. Furthermore, this leads teams to co-construct general principles that can be applied in future settings and move from isolated experiences and reflections towards learning in the form of developing more abstract representations.

The process report on the other hand provides students with an opportunity to understand and reflect upon their experiences in the light of the literature. Through the

process of understanding and interpreting contextual, idiosyncratic incidents with the help of theory, students can see generic aspects of their own behaviors (Brookfield, 2017). In EiT, the use of theory is presented as a tool to illuminate and structure students' experiences that arise during the course, and to put them into words. The point of departure for the students' learning is their own experiences, and theory provides an additional dimension to the learning. Without using the scholarship lens in their reflections, students would miss out on an opportunity to apply an academic perspective that lifts them above their own subjective experiences (Boud et al., 1985). It is through this abstraction process that students can find new solutions and define actions for improvements.

Constructive alignment

Besides the importance of different activities, a constructive alignment between teaching approaches and assessment practices is a central factor for student learning and motivation (Bopele & Vemuri, 2017; Biggs, 2012). In EiT, reflection has therefore been assigned an explicit, clear, and fully integrated role within the course structure. Reflection is framed both as a means (a learning activity they do) and an end (a skill that students develop for use throughout their lives). As part of the overall goals of the EiT course, the syllabus states that students should be able to identify and reflect on key aspects of a teamwork process and use this information to develop and improve teams that they are working in.

To establish an alignment between teaching approaches and assessment, the EiT Section has developed common assessment practices for all villages. The final summative assessment takes into account both the project itself and the teams' collaborative process. Each student team submits two written reports: one report describing the project they have completed and one process report in which they reflect on the process and development of their team dynamics, exemplified by specific situations from their teamwork processes. In the process report, students explicitly discuss all four stages of the experiential learning cycle by describing concrete experienced situations, linking them to their reflections and emotions, putting these experiences in perspective through theoretical concepts, and developing specific actions for improvement.

Each of the reports is assessed separately and accounts for 50% of the team's grade in the course. All grades are group grades and no individual summative assessments are made. The assessment system thus provides an explicit framework for the students' reflection work along the way. It is intended to foster reflection and discussion of the team's cooperation during the course, thus aligning the reflective learning activities with the assessment.

Training of the teaching staff

In addition to providing a framework for EiT, another important role that the academic developers in the EiT Section have is to provide training for the teaching staff. Training seminars are held during the semester prior to the EiT course, summarized in [Figure 3](#). The training is based on the same concept of EL that forms the basis for the students'

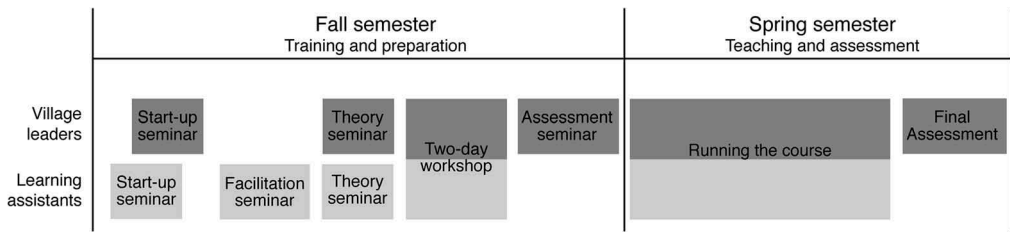


Figure 3. Training modules for the EiT teaching staff.

learning. Over the years more than five hundred academics have gone through the training and taught the course.

At the center of the training is a practical experience-based two-day workshop that focuses on how to provide a platform for the development of teamwork skills. The teaching staff themselves participate in teams, where they reflect by themselves and together on the cooperation in the team. Through this training, village leaders not accustomed to EL get the necessary experience and support to teach in the EiT course. In addition, village leaders have seminars coupled to the assessment practices in EiT and a basic introduction into theories on group dynamics and team processes. This is important as the interdisciplinary profile of the course means that there are large differences in pre-knowledge in these areas amongst the teachers.

The learning assistants, on the other hand, have additional practical training in the facilitation of team processes. The focus is on giving them the necessary practical and theoretical training to observe teams, highlight various aspects of a teams' group dynamics, and facilitate a team to reflect upon this input. Through training in facilitation, learning assistants gain an understanding of their role as external observers who help create a setting in which the teams can see themselves, and thus reflect on and take responsibility for their own interaction and teamwork.

In addition to the seminars, the EiT Section has developed a handbook for the teaching staff as a written resource providing structure for the training, with information to help the teaching staff plan and carry out the learning activities in the village (Sortland, 2018a). Reflection is presented and integrated in different parts of the book. The handbook is revised every year based on observed practice, reflected experience, and feedback from the teaching staff.

Summary and outlook

This article offers a starting point in how reflection can be implemented in a university wide interdisciplinary course. Based on our long experience with EiT, we argue it is necessary for academic developers to develop, test, evaluate, and provide different tools and approaches that can help and support teaching staff in this process. Through these types of support, teachers can more easily adapt their own teaching and feel enabled to promote reflection as a core activity of student learning. Two entry points have been

imperative for academic development in EiT: the framework of a course and the training of the teaching staff.

Through the continuous development process in EiT, a course framework has emerged that emphasizes integrating explicit reflection practices as a central component of the course pedagogy. While EiT is working at a large scale with over 2300 students, we consider this framework and the experiences and approaches described here as highly relevant for all types of courses, as the different reflection levels and corresponding activities can be adapted into different contexts and disciplinary settings. The reflective pyramid provides a conceptual frame to see reflections as something more than individual thoughts and helps students integrate different perspectives in their reflections. In this way, it supports them to move reflections beyond the descriptive level and develop reflection skills step by step through three different levels, from personal reflection, to team reflection, to meta reflections. The degree to which this happens and the underlying principles are something that we wish to explore in more detail in the future by asking the following questions: What impact does the EiT approach have on students' learning and skill development?; How do students perceive the value of reflection before and after EiT?; and, What prevailing effects does the EiT course have on students?

The focus in this article has been on the boundary conditions, teaching staff, and academic developers. In addition to the reflection pyramid, the constructive alignment between learning activities, intended learning outcomes, and assessment practices play an important role for students to develop their reflective skills (Biggs, 2014) and have been a focus area in EiT. The summative assessment of reflections is challenging (Wallin & Adawi, 2018a), but we argue that by emphasizing the importance of different lenses this can be mediated. The process of moving reflections to a more abstract level makes it easier to assess and compare them.

Besides the overall framework, developing teaching materials has played an important role to support teaching staff in EiT. The materials provide teaching staff with concrete approaches that can be readily integrated in their teaching, for example ways to allocate time in the day-to-day work for written and oral reflection, and specific activities that support students at all levels of reflective skill. However, from our experiences, the framework and teaching materials alone are not sufficient to support the teaching staff and ensure that EL and reflection are core elements in EiT. It is through the training that teachers and learning assistants get the necessary support to fully embrace EiT. By experiencing and practicing themselves the importance of reflection in EL, they build a deeper understanding about what is important in EiT and how they can help students throughout the course. One example is the emphasis on creating a safe and supportive learning environment for the students so that they apply their reflection skills in the learning process.

Finally, in addition to the concrete elements that emerged from EiT and can be adopted to other courses, we think that this article provides an interesting twist on academic development. By centering it around a university wide course that teachers work with, instead of supporting teaching staff on an individual level with their courses or providing more general support through training and seminars, this article outlines the possibility to have a course as the platform for academic development. The overall aim is that teachers and learning assistants can experience new approaches to teaching

and learning and stimulate them to adapt them beyond EiT. Even though the course has a long history of over 17 years, there is a lack of empirical research on this facet of EiT. From anecdotal stories and parts of the evaluation process, we see that the EiT course might have positive long-term effects on the prevailing teaching practices at NTNU, but we lack systematic research on this aspect. Therefore, we wish to explore this area in more detail in the future by posing the question: How can this type of academic development contribute to a university wide shift in teaching and learning practices?

Acknowledgments

We would like to thank the EiT academic section and especially Bjørn Sortland, Head of the EiT Section, for continuous support. We would also like to thank Professor Emeritus MD PhD, psychologist and psychiatrist Are Holen for countless contributions to EiT, comments and encouragement. Finally, we are grateful for all the people that have been teaching and learning in EiT throughout the years.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Sven Veine is an Assistant Professor at Experts in Teamwork academic section, Department of Industrial Economics and Technology Management, at NTNU, Trondheim, Norway. He is a Cand. Philol. in Drama and Theatre, and holds a Master of Management degree. His research interests in higher education include personal development, collaboration and teamwork skills through experiential learning, teaching and learning improvisation, and reflection as a learning method.

Martha Kalvig Anderson is an Assistant Professor at Experts in Teamwork academic section, Department of Industrial Economics and Technology Management, at NTNU, Trondheim, Norway. She is a M.Sc. in Counselling and works with group development and training teaching staff in experience-based teaching methods. Her research interests include reflection as a learning activity, group development, personal development, and peer learning.

Nina Haugland Andersen is a higher executive officer at Experts in Teamwork academic section, Department of Industrial Economics and Technology Management, at NTNU, Trondheim, Norway. She holds a BSc in Humanities. She has worked with the course Experts in Teamwork at NTNU for 10 years, mainly with the development of learning materials.

Thomas Christian Espenes is an Assistant Professor at Experts in Teamwork academic section, Department of Industrial Economics and Technology Management, at NTNU, Trondheim, Norway. He holds a M.Sc. in psychology, specializing in work and organizational psychology. His research interests include group dynamics, motivation, attitudes and behavior change.

Tove Bredesen Søyland holds a Master of Science degree in Psychology with a specialization in Health, Organizational and Communication Psychology. Her research interests include intragroup conflict, team performance, collaboration and teamwork skills, learning in teams, and reflection as a learning method.

Patric Wallin is an Associate Professor at the Department of Education and Lifelong Learning, at NTNU, Trondheim, Norway. He holds a Ph. D. degree in Bioscience with a specialization in Educational science. Patric's research interests in higher education are focused around personal development, interdisciplinary learning, peer-learning, and reflections. He is particularly interested in how universities can create learning environments where students learn with and from each other over disciplinary boundaries.

Jonathan Reams practices the cultivation of leadership through awareness based consulting, coaching and leadership development program design and delivery in a variety of settings. He has a position at the Norwegian University of Science and Technology (NTNU), serves as Editor-in Chief of *Integral Review*, and is a co-founder of the Center for Transformative Leadership and of the European Center for Leadership Practice. He teaches courses at NTNU on coaching and leadership development, and has presented at international conferences on topics such as leadership development, consciousness research, and transformative learning.

ORCID

Sven Veine  <http://orcid.org/0000-0002-3575-4932>

Martha Kalvig Anderson  <http://orcid.org/0000-0002-9471-894X>

Nina Haugland Andersen  <http://orcid.org/0000-0002-6513-2667>

Thomas Christian Espenes  <http://orcid.org/0000-0001-9988-5133>

Tove Bredesen Søyland  <http://orcid.org/0000-0002-9924-8246>

Patric Wallin  <http://orcid.org/0000-0001-6222-8543>

Jonathan Reams  <http://orcid.org/0000-0002-0673-2611>

References

- Biggs, J. (2012). What the student does: Teaching for enhanced learning. *Higher Education Research & Development*, 31(1), 39–55.
- Biggs, J. (2014). Constructive alignment in university teaching. *HERDSA Review of Higher Education*, 1, 5–22.
- Bopele, B., & Vemuri, S. (2017). Conceptualising strategic alignment between curriculum and pedagogy through a learning design framework. *International Journal for Academic Development*, 22(4), 278–292.
- Boud, D., Keogh, R., & Walker, D. (1985). *Reflection: Turning experience into learning*. London, NY: RoutledgePalmer.
- Brookfield, S. (2017). *Becoming a critically reflective teacher* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Christie, M., & de Graaff, E. (2017). The philosophical and pedagogical underpinnings of active learning in engineering education. *European Journal of Engineering Education*, 42(1), 5–16.
- Coulson, D., & Harvey, M. (2013). Scaffolding student reflection for experience-based learning: A framework. *Teaching in Higher Education*, 18(4), 401–413.
- Dymont, J. E., & O'Connell, T. S. (2010). The quality of reflection in student journals: A review of limiting and enabling factors. *Innovative Higher Education*, 35(4), 233–244.
- Fabriz, S., Dignath-van Ewijk, C., Van Poarch, G., & Büttner, G. (2014). Fostering self-monitoring of university students by means of a standardized learning journal - A longitudinal study with process analyses. *European Journal of Psychology of Education*, 29(2), 239–255.
- Felder, R. M., & Brent, R. (2004). The intellectual development of science and engineering students. Part 1: Models and challenges. *Journal of Engineering Education*, 93(4), 269–277.
- Gordijn, F., Eernstman, N., Helder, J., & Brouwer, H. (2018). *Reflection methods: Practical guide for trainers and facilitators*. Wageningen: Wageningen University and Research.

- Grossman, R. (2009). Structures for facilitating student reflection. *College Teaching*, 57(1), 15–22.
- Harvey, M., Coulson, D., Mackaway, J., & Winchester-Seeto, T. (2010). Aligning reflection in the cooperative education curriculum. *Asia-Pacific Journal of Cooperative Education*, 11(3), 137–152.
- Harvey, M., Coulson, D., & McMaugh, A. (2016). Towards a theory of the ecology of reflection: Reflective practice for experiential learning in higher education. *Journal of University Teaching & Learning Practice*, 13(2), 1–20.
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education*, 11(1), 33–49.
- Helgesen, H. C., Slåtten, M., Sortland, B., & Vikjord, K. S. (2009). Fasilitering som pedagogisk praksis i eksperter i team. In H. Fyhn, (Ed.), *Kreativ tverrfaglighet: Teori og praksis* (pp. 117–133). Trondheim: Tapir Akademisk forlag.
- Holen, A. (2000). The PBL group: Self-reflections and feedback for improved learning and growth. *Medical Teacher*, 22(5), 485–488.
- Hovdhaugen, E., & Aamodt, P. O. (2005). *Ekspert i team: En evaluering av et tverrfaglig emne ved NTNU gjennomført våren 2005*. Retrieved from <http://hdl.handle.net/11250/274960>
- Jacob, W. J. (2015). Interdisciplinary trends in higher education. *Palgrave Communications*, 1(1), 15001.
- Jonassen, D., Strobel, J., & Lee, C. B. (2006). Everyday problem solving in engineering: Lessons for engineering educators. *Journal of Engineering Education*, 95(2), 139–151.
- Karm, M. (2010). Reflection tasks in pedagogical training courses. *International Journal for Academic Development*, 15(3), 203–214.
- Kolb, D. A. (1984). *Experiential learning; experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.
- Mann, K., Gordon, J., & MacLeod, A. (2009). Reflection and reflective practice in health professions education: A systematic review. *Advances in Health Sciences Education*, 14(4), 595–621.
- Mezirow, J. (1997). Transformative learning: Theory to practice. In P. Cranton (Ed.), *Transformative learning in action: Insights from practice. New directions for adult and continuing education* (Vol. 74, pp. 5–12). San Francisco, CA: Jossey-Bass.
- Moon, J. (1999). *Reflection in learning and personal development: Theory and practice*. London: Kogan Page.
- Moon, J. (2004). *A handbook of reflective and experiential learning: Theory and practice*. London: Routledge Falmer.
- Quinton, S., & Smallbone, T. (2010). Feeding forward: Using feedback to promote student reflection and learning - a teaching model. *Innovations in Education and Teaching International*, 47(1), 125–135.
- Schön, D. A. (1983). *The reflective practitioner*. New York, NY: Basic Books.
- Sortland, B. (2006). EiT – Interdisciplinary teamwork: Preparing students for working life. In Y. Fan, et al. (Ed.), *Assuring university learning quality: Cross-boundary collaboration* (pp. 106–125). Trondheim: Tapir Akademisk Forlag.
- Sortland, B. (2015). Læringsarena for tverrfaglig samarbeid-Ekspert i team. *Uniped*, 38(04), 284–292.
- Sortland, B. (Ed.). (2018a). *Experts in Teamwork 2019. Handbook for village supervisors and learning assistants* (9th ed.). Trondheim: NTNU.
- Sortland, B. (Ed.). (2018b). *Students in Experts in Teamwork. Book of reflections 2019*. Trondheim: NTNU.
- Spelt, E. J. H., Biemans, H. J. A., Tobi, H., Luning, P. A., & Mulder, M. (2009). Teaching and learning in interdisciplinary higher education: A systematic review. *Educational Psychology Review*, 21(4), 365–378.
- Stocks, C., & Trevitt, C. (2016). The place of trust in continuing professional learning programmes: Supporting authentic reflection in portfolio assessment. *International Journal for Academic Development*, 21(3), 219–229.

- Tanner, K. D. (2012). Promoting student metacognition. *CBE Life Sciences Education*, 11(2), 113–120.
- Wallin, P., & Adawi, T. (2018a). The reflective diary as a method for the formative assessment of self-regulated learning. *European Journal of Engineering Education*, 43(2), 507–521.
- Wallin, P., & Adawi, T. (2018b). Entry points when undergraduate research mentors reflect on their role: A qualitative case study. *International Journal for Academic Development*, 23(1), 41–51.
- Wallin, P., Lyng, R., Sortland, B., & Veine, S. (2017, June). Experts in Teamwork - A large scale course for interdisciplinary learning and collaboration. *13th International CDIO Conference* (pp. 327–338). Calgary: University of Calgary.
- Wallin, P., Reams, J., Veine, S., & Anderson, M. K. (2018). Creating responsive learning environments to develop students' reflective capacity. *Integral Review*, 14(1), 167–186.
- Wankat, P. C. (2002). *The effective, efficient professor: Teaching, scholarship, and service*. Boston, NJ: Allyn and Bacon.
- Wedelin, D., & Adawi, T. (2014). Teaching mathematical modelling and problem solving - A cognitive apprenticeship approach to mathematics and engineering education. *International Journal of Engineering Pedagogy (IJEP)*, 4(5), 49–55.