Work and Learning across Boundaries: Artifacts, Discourses, and Processes in a University Course

Mikhail Fominykh¹, Ekaterina Prasolova-Førland¹, Sobah Abbas Petersen², and Monica Divitini³

¹ Program for Learning with ICT, Norwegian University of Science and Technology, Trondheim, Norway
{mikhail.fominykh,ekaterip}@ntnu.no
² SINTEF Technology & Society, Trondheim, Norway
sobah.petersen@sintef.no
³ Department of Computer and Information Science, Norwegian University of Science and Technology, Trondheim, Norway
divitini@idi.ntnu.no

Abstract. Boundary objects can provide bridges across boundaries and facilitate collaboration between learners with different backgrounds. In this paper, we explore cooperation in a cross-disciplinary and cross-cultural context, focusing on the opportunities for learning that arise at different boundaries and on corresponding boundary objects to facilitate both collaboration and learning. We present and discuss a study we conducted within a Cooperation Technology course. The discussion provides implications for collaboration support across boundaries, including insights on why they are important, how to facilitate their creation, and how to use technologies for that.

Keywords: cooperation technology, boundary objects, collaborative learning.

1 Introduction

Significant part of course assignments and projects at universities are done in groups in order to promote collaborative learning and to prepare students for team-based activities in a workplace. Participants of the collaborative activities often have different backgrounds, e.g., in terms of studied discipline and culture, schedules, level of engagement and interests. On the one hand, this may facilitate a creative process and innovative ideas through the “symmetry of ignorance” [1,2]. On the other hand, cooperation problems among the students are rather common and often lead to frustration and disruptions in the learning process [3,4].

Starting from the core notion of learning communities”, in this paper we investigate how boundary objects can help improving collaboration and learning [5-9] within a university course. In particular, we explore opportunities for collaborative learning that arise when using boundary objects and related challenges.

The paper is based on a Cooperation Technology course at our university that integrates lectures with a group project in which the students had to collaborate in
different settings to create shared artifacts, and thereby construct new knowledge. Cooperation was supported with a variety of tools that we will hereafter indicate with the generic term cooperation technology. Designing the course, we applied the social constructivist approach which implies that learners co-construct their environment and understanding together [10]. In the paper, we discuss the outcomes of the course and our experience, focusing on how students supported their cooperation across boundaries and used specific tools for that. Based on this discussion, we outline implications for cooperation support across boundaries in a social learning system, e.g., why boundary objects are important, how to facilitate their creation and what technologies to choose to achieve more efficient collaboration and learning.

2 Background and Related Work

Boundaries arise from “different ways of engaging with one another, different histories, repertoires, ways of communicating and capabilities” [5]. They are important to consider for supporting ‘social learning systems’ [5], because of the learning opportunities they provide and connections they create between different communities and groups. Boundary objects are critical since they provide bridges and have meaning across the boundaries of the individual knowledge systems, groups or sub-communities that join together for some purpose [5-7]. Boundary objects serve groups or communities in situations where each participant has only partial knowledge and partial control over the interpretation of an object [6,8,9]. In this way, boundary objects allow different knowledge systems and communities to interact by providing a shared reference that is meaningful within both parts. Such objects perform a brokering role involving “translation, coordination, and alignment among the perspectives of different Communities of Practice” [6]. Boundary objects are typically negotiated, dynamic and have emergent characteristics.

Boundary objects can take different forms. According to Wenger, boundary objects can be classified into three groups: artifacts, discourses, and processes [5]. Artifacts may be documents, models, virtual places [11] that have meaning across boundaries. In our study, shared artifacts can be seen as physical representation of knowledge that a group of students collaboratively create during project work. Such artifacts become boundary objects if they are created by a group or a community and can be understood by all members of the community, and decontextualized. Discourses represent a common language that the participants of a collaborative process can use to communicate across boundaries [5]. Discourses are negotiated terms and language constructions that have the same meaning for all the participants. In our study, discourses can be seen as the language the students used to communicate in synchronous discussions and by commenting upon the work done by others. Processes include negotiated routines and procedures that allow coordination across boundaries [5], independently by practices established within boundaries. In our case, processes are represented by rules and agreements that allow synchronizing schedules and coordinating work styles of the individual students within and between groups.