ONLINE LEARNING LOGBOOKS AS BOUNDARY OBJECTS ACROSS EDUCATIONAL CONTEXTS

N. Sansone[1], M. Fabbri[2], I. Bortolotti[3]

[1]Unitelma Sapienza University of studies of Rome (ITALY)
[2]Alma Mater Studiorum University of Bologna (ITALY)
[3]Sapienza University of Rome (ITALY)

Abstract

This paper examines an online I level master's program held by UnitelmaSapienza (Rome, IT), meant for teachers, trainers, and educators from diverse fields and backgrounds. Throughout the program, the learners engage in a series of meaningful activities aimed at creating knowledge artifacts, following the Trialogical Learning Approach. Our focus here is on the "Multimedia Context" activity, where 14 groups of four participants each cover specific roles and cooperate to develop a multimedia learning resource on a chosen topic. Employing a qualitative approach, this study analyses the online logbooks generated during this group activity, totalling 84 logbooks and 742 units of analysis. The objective is to investigate the potential of this device tool to act as a meta-boundary object while participants are actively involved in constructing concrete educational artifacts. The content analysis thus delves into how objects and practices facilitate learning and participation, with a specific emphasis on (a) mediation, (b) practices, and (c) the training path. Additionally, it explores how students' identities evolve within the group context, considering the dimensions of (a) We, (b) the Group, (c) I, (d) the Other. Given the study's overarching purpose, the results suggest that the learning logbooks may serve as standardized forms of boundary objects, enabling professionals from diverse communities of practice to exchange ideas, concepts, and tools from seemingly unrelated domains within the focal domain of inquiry.

Keywords: trialogical learning approach; teachers' training; reflexivity; boundary objects; boundary practices; positioning.

1   INTRODUCTION

Reflexivity assumes a pivotal role in the strategic development of teachers' training programs. Designers and trainers must therefore meticulously orchestrate and implement situated and proactive learning contexts that nurture reflexivity and are facilitated by purpose-built participatory instruments [1]. Considering this framework, we conducted an in-depth analysis of logbook-based reflexive practices within a master's degree program tailored to a diversified array of educators. This program draws inspiration from the Trialogical Learning Approach (TLA) [2], grounded in the notion of learning as a sociocultural construct [3], emanating from the dynamic interactions among individuals participating within a Community of Practice (CoP) [4, 5].

Within the Trialogical paradigm, knowledge is primarily conceived as a product arising from the negotiations of group members who collaborate with the intent of crafting useful and engaging learning artifacts. In this context, the artifact assumes the role of a "boundary object" [6], serving as a conduit linking disparate communities. Within the CoP, learning transcends mere knowledge acquisition; instead, it constitutes active engagement, inherently fostering identity development. According to the Dialogical Self Theory [7], in fact, the Self comprises multiple fluid I-positions, continually evolving [8], traversing various identity trajectories which are influenced by contextual variables and resources, including tools and interpersonal interactions. In this dynamic framework, digital tools and environments play a mediating role [9], amplifying the dialogical essence of collaborative learning [10, 11].

This study revolves around a CoP comprising aspiring teachers and educators, collectively engrossed in the co-creation of meaningful artifacts [12]. The objective of this research is two-fold: firstly, to dissect the role and nature of shared objects and collaborative practices within individual learning and participation processes, as they are reflected in the learners' logbook entries—a central element of our training program. Secondly, the study endeavours to ascertain whether and how the online logbook may serve as a meta-boundary object, sustaining the overarching CoP while nurturing the development of new knowledge in the form of artifacts, concepts, and, notably, practices.

2   METHODOLOGY

The activity detailed in this contribution is situated within the framework of a Level I university master's degree program, encompassing a duration of 1500 instructional hours over a span of 12 months. This program, named "TASK," was delivered at distance during the a.y. 2020-2021 and was offered by UnitelmaSapienza University in Rome, Italy. TASK was meant to train a diverse cohort of participants, including schoolteachers, university professors, educators, and trainers in both public and private sectors. The overarching pedagogical approach of this program adheres rigorously to the Trialogical Design Principles, wherein learners are actively encouraged to collaboratively construct meaningful artifacts within the context of a Community of Practice (CoP). This collaborative endeavor is bolstered by the utilization of digital tools and underscores the importance of continual reflective practices [13].

This inquiry is centered on the activities that unfolded within the "Multimedia contest", involving 56 participants. Participants were self-organized into 14 distinct groups, each consisting of four members. Each group was tasked with the selection of a topic of relevance from a spectrum of educational tools, didactic methodologies, educational experiences, or learning theories. Subsequently, they were assigned the responsibility of generating a multimedia educational resource, comprising a video presentation, an infographic, and an evaluation quiz.

To facilitate effective group collaboration and individual accountability, each group member assumed a predefined role following a comprehensive intra-group negotiation process: coordinator, researcher, story boarder, and diarist - with our particular focus directed towards the latter role. In this context, the term "diarist" pertains to the learner who undertook the responsibility of maintaining an online logbook at the end of each phase of the activity, amounting to a total of six entries[1]. These logbooks were hosted on the Google Modules platform and encompassed two distinct types of notes that pertained to the recently completed activity phase: notes concerning the strategies employed by the group (note #1) and notes highlighting successful elements (note #2). Importantly, the diary was continually shared with the diarist's fellow group members, serving the dual purpose of facilitating substantive discussions related to their common objectives and fostering a heightened sense of community and cohesion within the group.

The Research Questions (RQ) guiding our study are as follows:

- RQ1: How do objects and practices enable learning and participation?
- RQ2: How does the learners' identity evolve during the group work?

In the process of data analysis, we employed a naturalistic approach, primarily relying on content analysis methods. Specifically, we developed two distinct coding schemes to address the research questions (RQs) that guided our study. To address RQ1, the coding scheme was meticulously designed to initially encompass any thematic elements that the diarists had included in their narratives. Subsequently, we refined these themes to focus exclusively on those that were pertinent to RQ1. These themes were subsequently categorized into three primary areas of interest: a) mediation, which pertained to those aspects perceived as conducive to learning, b) practices, encompassing group strategies and operational procedures, and c) the training path, representing a residual category of statements about the master's program and the "Multimedia Context". To address RQ2, we drew upon prior literature concerning identity positioning within collaborative learning contexts, thus adapting a set of dialogical indicators originally proposed by Ligorio and colleagues [14] to guide our analysis.

After the formulation of these coding schemes, two independent researchers conducted an analysis of the data, coding the selected units of analysis. A total of 741 units were coded for RQ1 and 717 units coded for RQ2, both demonstrating a high level of inter-judge agreement, characterized by near-perfect concordance among the researchers.

3   RESULTS

3.1   RQ1: How do objects and practices enable learning and participation?

Table 1 offers a comprehensive view of the themes emerging from the diaries, considering both the notes and each of the six phases of the activities.

---

[1] phase 1: Groups composition; phase 2: Topic definition; phase 3: Objects storyboarding; phase 4: Objects implementation; phase 5: Objects first version; phase 6: Objects final version and overall reflection

Table 1. Themes_overall frequencies

Focus	Category	f	f% per category	overall f%
Mediation (M)	Object (M-O)	260	67,89%	35,09%
	Group (M-G)	97	25,33%	13,09%
	Technology (M-T)	26	6,79%	3,51%
Total Mediation (M)		383	*100,00%*	*51,69%*
Practices (P)	Collaboration (P-C)	186	64,58%	25,10%
	Role-Taking (P-R)	69	23,96%	9,31%
	Organization (P-O)	33	11,46%	4,45%
Total Practices (P)		288	*100,00%*	*38,87%*
Training Path (T)	Contest (T-C)	47	67,14%	6,34%
	TASK (T-T)	23	32,86%	3,10%
Total Training Path (T)		70	100,00%	*9,45%*
Total		741	100,00%	100,00%

It is clear how when the diarists engage in reflective processes concerning the group activities, they primarily focus on the mediating role played by specific elements of the experience (M: 51.69%). Notably, the trialogical object being constructed is perceived as a catalyst for a productive learning experience, as exemplified by this diarist: *"At the beginning, our discussion focused on innovative methodologies for learning development and motivation because we did not consider it satisfactory to experiment with an innovative tool, rather we wanted to delve deeper into the functional methodological field of learning"* (#105, 10-03, phase#2).

Note#1, focusing on group strategies, reveals how the Practices are deemed as central (P: 43.39%), with a particular emphasis on Collaboration (P-C: 30.35%). However, when the diarists are asked to identify the strengths of their respective groups - Note#2 -, they once again pivot towards Mediation (M: 62.11%), albeit in the form of Group Mediation (M-G: 37.00% : *"An 'afflatus' that immediately enveloped us: no stress, disinterest in exaggerated racing aspects, not letting ourselves get caught up in the anxiety of the race for 'victory' and also a certain playful spirit that doesn't hurt"* (#7, 04-03, phase#1).

Also when the diarists have to reflect on their group's operational methods over time (note#1, Figure 1), during the initial phases of the activity (phase#1: Group composition), their attention naturally gravitates toward practices like Collaboration (e.g., *"To confront each other, in addition to the WhatsApp group, we have established to hold periodic meetings via Google Video Call Meet."* - #21, 03-03, phase#1) and Organization (e.g., *"We found each other quickly, first me and X with whom I had done the previous activity, then we agreed to put the request for fellow adventurers on the forum, and Y and Z joined us"* - #21, 03-03, phase#1). However, as the activity progresses, with phases ranging from object implementation (phase#4) to object finalisation and overall reflection (phase#6), the Object becomes increasingly salient – probably because during the creation of the three micro-objects, each group member individually dedicates to one of them.
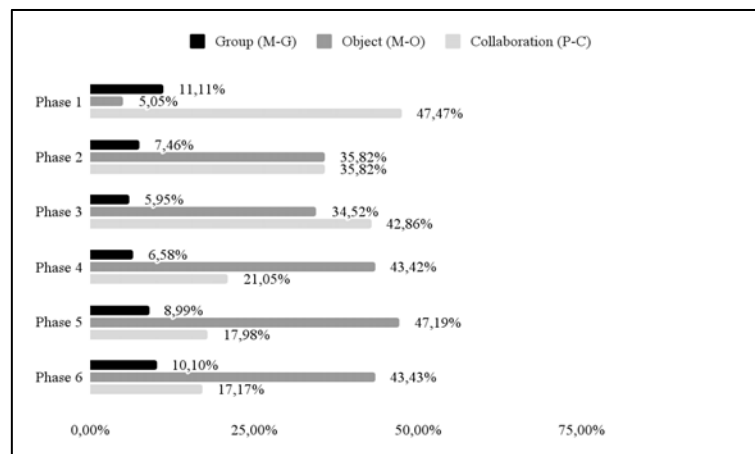

Figure 1. Themes most focalized during time: note#1

In the end, during the phases aimed at finalizing the initial version of the object, the mediation provided by the Group emerges as the most prominent and valued aspect (M-G, phase#5: 45.95%): "*the group was able to confront each choice, and no one was entrenched in predetermined positions*" (#171, 10-04, phase#5).

3.2 RQ1: How do the learners' identities evolve during the group work?

The identity positioning mainly assumed by the diarists revolves around The Other (O: 50.77%, Table 2). This positioning encompasses observations of colleagues' behaviors, interactions with educational materials, and the influence of others' voices within the activity [14]: *"Our producer, with her precision and assertiveness, is undoubtedly the driving force of the group"* (#132, 11-03, phase#1).

Table 2. Positioning_overall *frequencies*

Positioning	f	f%
The Other (O)	364	50,77%
We (W)	226	31,52%
The Group (G)	92	12,83%
I (I)	35	4,88%
Total	717	100,00%

In the instances where the positioning shifts away from The Other, the diarists adopt a We position (e.g., *"We all contributed to the discussion and did not settle. We raised doubts and sought answers together."* - #43, 10-03, phase#2) or, to a lesser extent, The Group position ("*The group discusses the structure and decides that a detailed storyboard needs to be drafted. By mutual agreement, a table was prepared on Moodle."* - #403, 16-04, phase#2). The I position is relatively less frequent (e.g., *"As coordinator, I created a WhatsApp group to exchange messages to get to know each other …"* - #64, 07-03, phase#1). Covering the role, in fact, the diarist often speaks on behalf of the group and their fellow participants.

Notably, when the diarists are asked to identify the strengths of their own group (Figure 2), The Other assumes an even more prominent role: *"A collaborative spirit, a willingness to share skills, a practical sense and a belief that it is much easier to learn if you have fun"* (#15, 06-03, phase#1)
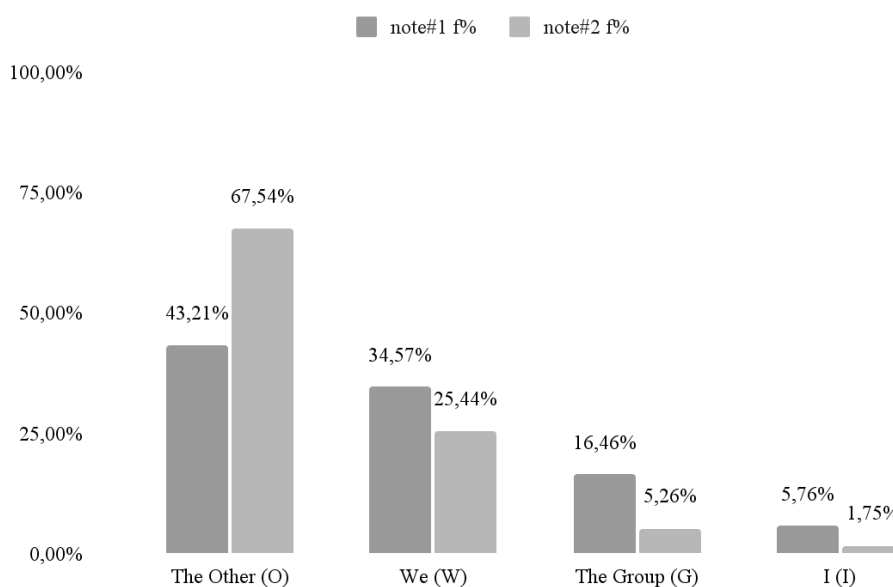

Figure 2. Positioning_cfr note#1 and note#2

Upon further examination of the positioning over the course of the activity (Table 3), it becomes evident that The Other takes center stage in phases#4 (O: 56.34%) and #5 (O: 57.69%). During these phases, the focus is on external influences, such as colleagues' behaviors, interactions with educational

materials, and the impact of others' voices, as demonstrated by the following comment: *"in terms of ongoing alignment among the three micro-objects during their construction, both in terms of logic and content and from a graphical point of view"* (#158, 10-04, phase#5). In contrast, the initial phases (W: 42.11% in phase#1, 44.71% in phase#3) witness a more pronounced emphasis on We positioning. Here, participants tend to reflect on their collective identity and collaborative efforts, as exemplified by statements like: *"We are entering content on the topic from which we will need to design the whole activity, starting with research questions shared by all group members"* (#203, 22-03, phase#3). Additionally, the Group position gains prominence during these early phases (G: 27.37%), particularly in discussions related to group composition: *"The group was composed following the formation of the other groups by involving taskers who were not yet included"* (#85, 10-03, phase#1).

Table 3. Positioning_overall frequencies during time

	Phase 1		Phase 2		Phase 3		Phase 4		Phase 5		Phase 6	
Positioning	note#1	note#2	note#1	note#2	note#1	note#2	note#1	note#2	note#1	note#2	note#1	note#2
						f%						
The Other (O)	21,05%	51,52%	45,45%	63,64%	35,29%	72,50%	56,34%	65,91%	57,69%	86,11%	49,45%	64,29%
We (W)	42,11%	36,36%	37,88%	30,30%	44,71%	22,50%	23,94%	25,00%	25,64%	11,11%	30,77%	28,57%
The Group (G)	27,37%	9,09%	13,64%	3,03%	15,29%	5,00%	12,68%	6,82%	12,82%	2,78%	14,29%	4,76%
I (I)	9,47%	1,75%	3,03%	3,03%	4,71%	0%	7,04%	2,27%	3,85%	0%	5,49%	2,38%
Total for phase	*19,55%*	*14,47%*	*13,58%*	*14,47%*	*17,49%*	*17,54%*	*14,61%*	*19,30%*	*16,05%*	*15,79%*	*18,72%*	*18,42%*

This pattern is similarly observed when reflecting on the strengths of the group (Figure 2, note#2). The Other assumes a dominant position following phase#5 of Objects' first version (O: 86.11%), as diarists frequently highlight the influence of external factors on the group's dynamics and accomplishments. Conversely, during the initial phases of Group composition (W: 36.36%) and of Topic Definition (30.30%), the We position prevails. Participants emphasize their shared experiences, constructive interactions, and the sense of enjoyment derived from collaborative efforts, such as: *"I also want to emphasize that we Dimonios approach this educational experience seriously but at the same time manage to have fun while stimulating constructive comparisons"* (#12, 05-03, phase#1).

4   CONCLUSIONS

The reflections written down by diarists in their journals shed further light on the significance of trialogical objects and collaboration as key elements influencing learning experiences and productive participation. They seem to serve as those boundary objects and practices that establish connections across different communities. Yet, the processes of negotiation and organization described by the diarists evolve over time in alignment with the activities being undertaken, confirming how "the practice, shaped through the use of boundary objects, is not static but rather a dynamic process that facilitates organizational evolution and survival" [15] (p. 8). Boundary objects play a crucial role in facilitating transitions and interactions by promoting effective communication, collaboration, and knowledge exchange among professionals belonging to various communities of practice [15, 16]. Simultaneously, the dominance of the 'The other' (50.77%) and 'We' (31.52%) categories over 'The group' (12.83%) and the 'I' (4.88%) demonstrates the progressive development of the 'social' aspect of the individual identities [17].

Together considered, our results suggest that online diaries serve as boundary devices capable of fostering reflective thinking. Whether undertaken at the outset, during the process, or upon completion of the collaborative object building, online diaries facilitate the conceptualization of personal and collective knowledge. Moreover, they serve as instruments for reification, achieved through the co-construction of trialogical objects, and for the representation of values, objectives, and meanings [16]. All in all, online diaries trigger practices and reflective processes related to both individuals' roles within a group and their own professionalization practices. With this dual purpose, a semi-structured online diary emerges as a reflective instrument enabling the externalization of the processes involved in constructing individual and collective knowledge.

REFERENCES

[1]   N. Sansone, I. Bortolotti, M. Fabbri, "Collaborative peer-feedback practices in hybrid learning environments", *Education Sciences & Society*, vol, 14, no. 1, pp. 174-187, 2023. Retrieved from: https://doi.org/10.3280/ess1-2023oa15283

[2]   S. Paavola, K. Hakkarainen, "The Knowledge Creation Metaphor - An Emergent Epistemological Approach to Learning", *Science & Education,* vol. 14, no. 6, pp. 535-557, 2005. Retrieved from: https://doi.org/10.1007/s11191-004-5157-0

[3]   L.S., Vygotsky, Mind in society: The development of higher psychological processes. Harvard, MA: Harvard University Press, 1978.

[4]   E. Wenger, R. McDermott, W.M. Snyder, *Cultivating communities of practice*. Harvard, MA: Harvard Business Press, 2002.

[5]   J. Lave, E. Wenger, *Situated Learning: Legitimate Peripheral Participation*. Cambridge, UK: Cambridge University, 1991.

[6]   E. Wenger, *Communities of practice: learning, meaning and identity*; New York, NY: Cambridge University Press, 1998.

[7]   H.J.M. Hermans, "Voicing the self: From information processing to dialogical interchange", *Psychological Bulletin*, vol. 119, no. 1, pp. 31-50, 1996. Retrieved from: https://doi.org/10.1037/0033-2909.119.1.31

[8]   H.J.M Hermans, "Introduction: The Dialogical Self in a Global and Digital Age", *An International Journal of Theory and* Research, vol. 4, no. 4, pp. 297-320, 2004. Retrieved from: https://doi.org/10.1207/s1532706xid0404_1

[9]   H. Muukkonen, M. Lakkala, K. Hakkarainen, "Technology-mediation and tutoring: How do they shape progressive inquiry discourse?", *The Journal of the Learning Sciences*, vol.14, no. 4, 2005. Retrieved from: https://doi.org/10.1207/s15327809jls1404_3

[10]   M.B. Ligorio, "Dialogical relationship between identity and learning", *Culture & Psychology*, vol. 16, no. 1, pp. 109-115, 2010. Retrieved from: https://doi.org/10.1177/1354067X09353206

[11]   R. Wegerif, "A dialogic understanding of the relationship between CSCL and teaching thinking skills", *Computer Supported Learning*, vol.1, pp. 143-157, 2006. Retrieved from: https://doi.org/10.1007/s11412-006-6840-8

[12]   S. Paavola, M. Lakkala, H. Muukkonen, K. Kosonen, K. Karlgren, "The roles and uses of design principles for developing the trialogical approach on learning", *Research in Learning Technology*, vol. 19, no. 3, pp. 233-246, 2011. Retrieved from: https://doi.org/10.1080/21567069.2011.624171

[13]   N. Sansone, V. Grion, "The 'Trialogical Learning & Assessment Approach': Design principles for higher education", *Qwerty Journal*, vol. 17, no. 2, pp. 10-28, 2022. Retrieved from: https://doi.org/10.30557/QW000055

[14]   M.B. Ligorio, F.F. Loperfido, N. Sansone, "Dialogical positions as a method of understanding identity trajectories in a collaborative blended university course". *Computer-Supported Collaborative Learning*, vol. 8, pp. 351-367, 2013. Retrieved from: https://doi.org/10.1007/s11412-013-9174-3

[15]   R. Konkola, T. Tuomi-Grohn, P. Lambert, S. Ludvigsen, "Promoting learning and transfer between school and workplace", *Journal of Education and Work*, vol. 20, no. 3, *pp.* 211-228, 2007. Retrieved from: https://doi.org/10.1080/13639080701464483

[16]   L. Bailey, "Refracted selves? A study of changes in self-identity in the transition to motherhood", *Sociology*, vol. 33, no. 2, pp. 335-352, 1999. Retrieved from: https://doi.org/10.1177/S0038038599000206

[17]   J. Lukinsky, "Reflective Withdrawal Through Journal Writing" in *Fostering critical reflection in adulthood. A guide to transformative and emancipatory learning* (Mezirowet J.,ed), San Francisco, CA: Jossey-Bass, 1990