

# **Dynamics in the meaning negotiation: can online participation and reification processes be correlated in informal settings?**

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## **Abstract**

*According to Wenger's theory of Communities of Practice, the learning process is a fruit of complex dynamics that involves participation and reification processes, which are dual and essential for the meaning negotiation. So, given that both the processes are complementary and each cannot exclude the other, through the use of an ICT toolset within a virtual learning environment, it is possible to explore the dynamics of the respective processes in order to trace and individuate eventual correlations between them. Owing to the intangible nature of informal learning, a part of reification and participation phenomena will be untraceable, because they can happen also outside the e-learning platform, but, inviting e-learners to use a common forum within the VLE, it is possible to have a great part of traceable data about meaning negotiation. This paper deals with a sample of teachers invited to create individually some multimedia artifacts in a free context, using Moodle™ environment as common communicative preferred system. Through the use of Sociomatrix Finder software, it was possible to extrapolate the sociometric matrix of the teachers' social reticle in order to esteem the individual participation level; besides, an independent judge assessed all artifacts giving a vote to each reification. Comparing participative and reificative data it is possible to verify the existence of a correlation. The experience was repeated with some of teachers' students at the same conditions.*

**Keywords:** informal learning, SNA, participation, reification,

## **1. Learning as social practice and the role of educator in creating the conditions to grant its existence and development**

This paper assumes the Wenger's Community of Practice theory (1998) as reference according to which learning is conceived as a social activity that stands in practice of social exchanges and in particular in the fusion between participative and reificative processes among people. That fusion takes the name of meaning negotiation. Owing to the complex nature of learning and the empirical evidences of the importance of informal learning within individual and social learning processes, it is necessary for educators to stimulate learners in participating and producing something tangible that could be representative of meaning negotiation's dynamics.

The nature of informal learning processes, which is spontaneous, natural and free (Cross, 2007) and the non-traditional places in which it happens (usually outside schools, universities and other institutional places: see Lave, & Wenger, 1991), it is very difficult for an educator to engage his/her students in informal activities, for many reasons: first, although informal learning can happen inside school's boundaries, the

major part of it is probably activated by contacts outside school; second, assigning a precise task to learners means to impose a precise operative strategy which is in total contradiction with the informal nature of the processes that the educator wants to activate; third, if the educator wants to leave free his students, he has the necessity to evaluate their activities, but, monitoring them, he in practice would contradict the informal nature of the context in which informal learning should happen (Piave, 2008).

## **2. Relationship between Participation and Reification processes**

Wenger highlights how participative process represents a sort of reciprocal acknowledgement among learners (but it can imply also a level of common engagement among people, within the community of practice): it means that a mere measure of participation level can be insignificant for educators who want to evaluate informal learning. In practice, everyone can be involved at an high level without producing nothing or can be involved a little but producing many contributions to overall activity. Participation itself is not a measure of informal learning. In the same way, reification process, taken alone, is not a measure of informal learning, because it represents only a part of the whole production of an individual/community, but it does not communicate us anything about the way in which people were being led to that point of production, and makes difficult to individuate the individual contribution to the communitarian whole.

When participation and reification determine a meaning negotiation, they produce informal learning: they are a duality and are complementary. Owing to the evanescent nature of meaning negotiation, it is impossible to have a precise measure of informal learning, but it could be possible to have an esteem, taking in count of the complementary nature of both the processes and the possible correlation among them. The concept of complementarity is not considered here in mathematical terms, but as an ideal approach, in which in every single production of informal learning, there has to be both the participation and the reification, even if a part of them could result invisible for the observer. It implies that participation and reification can be correlated positively when informal learning happens: in other terms, it is probable that when the participation level is high and the reification level is also high, there could be a great informal learning production; besides, it implies also the contrary. More difficult is to investigate the correlation when a process is more present than the other and a possible process of estimation could be wrong. But, in general we could assume that a low level of reification (with an high level of participation) can be representative of a scarce (or invisible) production of informal learning. When, instead, the reificative evidences are strong while the participative level is scarce, it is difficult to make an esteem, because people can produce something significant and tangible both in the cases of scarce presence and of high involvement.

This paper deals with the possibility of verifying a correlation between participation and reification levels in informal settings which corresponds to a proof of effective learning activity. In order to do this, the ICT toolset was implemented within a VLE (that is Moodle™), in which people were called to collaborate in producing a personal

artefact about a theme of own interest, giving help to own colleagues in difficulty. The individual task was very simple, without a precise structure and granted the possibility to have a specific proof of reification not only through the common forum's posts but also through the evaluation of personal production.

### 3. The sample and the results

The sample consists of 27 teachers, chosen from a population of 127, who showed enough competence in the use of some web 2 applications<sup>i</sup>. The sample was divided into two groups: A group, which represented the traditional group of peers involved in a structured task under the monitoring activity of a tutor; B group which – instead - operated in informal context, without the supervision of a tutor and without precise instruction about the tools and the process of production. Both the groups were engaged in individual task consistent in the production of a multimedia artefact about a specific discipline. The activities made by both the groups were recorded online by VLE toolset and then analyzed under two different viewpoints:

- in the social network analysis (SNA) perspective, in order to obtain precise data about participation's levels;
- by an independent judge in order to obtain a vote about personal final production (with a number between 0 and 10), according to a fixed evaluation rubric (Arter & McTighe, 2001; Mertler, 2001)

Given that our hypothesis is about the informal context, B group represents our reference in this study. B group was observed in four distinct periods and the table below synthesizes the results with help of SNA's parameters (table 1).

The sociometric matrix was calculated by Sociomatrix Finder software, on the basis of precise conventions applied to the tree-structure of VLE's internal forum.

Sociometric status represents the sum of in-degree and out-degree parameters and expresses the role that each member had within the group (Knoke & Yang, 2008). We adopted that convention according to which it is necessary firstly to verify the presence of a roles' distribution in order to understand the nature of the observed group. The tutor's data are ignored because he was not influent on the whole process (the fact is demonstrated by the presence of a scarce variance of sociometric status for all the other members, who are allocated substantially on the same level).

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<sup>i</sup> This paper regards a part of a bigger experience which involved several Italian teachers in various aspect of formal/informal learning relationship [see more in Piave (2009). Social Network Analysis for e-assessment: reliability of formal and informal social reticles, in Proceedings of ICVL – International Conference on Virtual Learning, Jassy (Romania)], regarding a Master Course titled “La professionalità del docente e del dirigente scolastico”. Please make reference to that work for more clarifications about parameters and mathematic conditions applied here and in the following paragraphs.

High level of SS for the tutor are justified because in both the groups the tutor opened a thread to present the activity and, according to convention of Sociomatrix Finder software we used, the first who opens a thread in the forum, is considered as a member who sends a message to all the group.

INFORMAL CONTEXT'S GROUP OF TEACHERS SOCIOMETRIC STATUS DATA OBSERVED IN FOUR PERIODS (n=13, without the influence of the tutor)						
	I	II	III	IV	Other data	
Node	SS(i)	SS(i)	SS(i)	SS(i)	SS(i) average	Reification R(i)
Bea	1,46154	0,76923	0	0	0,5576923	10
Nifio	0,38462	0,76923	0,5385	0	0,423076943	9
papillon	0	0,07692	0	0	0,01923077	6
archimede	2,30769	2,15385	1,7692	0	1,557692325	6
morgana	0,15385	1,07692	0	0	0,307692315	5
mortisia	0,23077	0,30769	0	0	0,134615388	0
delfina	0,30769	0,07692	0	0	0,09615385	3
Ribe	1,46154	2,07692	0,1538	0	0,923076915	7
Alice	1	0,61538	0	0	0,40384616	4
Kaka	0,38462	2	0,6923	0	0,769230775	7
Prof	0,07692	0,07692	1,3077	0	0,365384615	3
Milka	0,30769	0,46154	0	0	0,192307695	10
Bros	0	1	1	0	0,5	5
TUTOR	3	3	1,9231	0	1,980769225	//
existing leadership	No	No	No	No		

Table 1

In practice, the roles' distribution is granted by the following mathematic condition:

$$\text{sociometric status variance} \geq \text{or} = 2 \cdot \text{sociometric status average}$$

$$\text{Var}[SS(i)] = \text{or} \geq 2 \cdot SS(i)$$

$$\text{Var}[SS(i)] = 0,319283 \text{ and } 2 \cdot SS(i) = 1,175824$$

$$\text{So: } 0,319283 < 1,175824$$

Otherwise the group is formed by peers without roles' distinctions.

Collected data (see table 1) demonstrated the informal nature of the B group: so it is a group of peers. Even including the sociometric status of the tutor, data confirm the informal nature of the group and consequently the insignificant role of the tutor during the whole activity, according to the informal structure of the task. There is not properly

a leader (although the tutor has constantly the highest level of participation in the group). B group operated in an intensive way, reaching substantially the same level of participation, with scarce differentiation.

Making reference to the votes attributed by judge about the personal artifacts made by teachers, we can observe more differentiation.

Calculating Pearson's coefficient between average of SS(i) and R(i) for each member, we obtain:

$$p = 0,247630411$$

Data show that SS(i) and R(i) are correlated positively. This measure can be considered reasonable because of the scarce variance of SS(i) values, so that the average of SS(i) levels seems to be significant and representative of the effective "weight" that each member had during the production in the group. A roles' distribution would avoid this kind of choice.

#### 4. Searching for further proof of correlation

In order to have a further proof of correlation, we repeated a similar experience with some students of the previous teachers. The proposed activity was similar: in fact, it consisted in making a personal multimedia artefact as answer to the previous artefact made by teachers. In this case, each teacher chose five students and engaged them in the activity( with the exception of Flox's group which has only three members). It were formed seven groups of students. There were 32 subjects in total, only a part of the whole sample which will include all teachers' students involved in this research.

Students belonging to informal groups, without the control of a tutor and in absence of precise instructions about their task, confirmed sufficiently the data observed in the previous stage of the experience. In particular, all students' groups confirmed that nature of informal group, having no significant roles' distribution.

In this stage of the experience, we called teachers to evaluate the general learning activity as result of their students' experience through an interrogation in classroom. Then we also asked independent judge to evaluate only the individual production. So here R(i) represents the vote given by the judge to the reification process (according to the same evaluation rubric used in the previous stage), while J(i) represent the measure, made by teachers, of the whole students' learning experience.

We found that (see table 2), with the exception of a one case, in all groups there is a correlation between R(i) and J(i): in other terms, a good reification process leads to a good level of learning, evaluable by teachers. Besides:

- in some cases the correlation between SS(i) and R(i) was inverse (Mortisia and Nigipa), but in the major part of them was direct (all the other groups);

*if SS(i) ↑, → R(i) ↑ (in general)*

in some cases the correlation between  $SS(i)$  and  $J(i)$  was inverse or absent (Mortisia, Papillon, Kikka), while in the major part of them was direct;

*if  $SS(i)$ ,  $\rightarrow J(i)$  (in general)*

Calculating the average among correlation results, we obtained that  $R(i)$  e  $J(i)$  are in general correlated and that  $R(i)$  e  $SS(i)$  are in general correlated. The same correlation exists in general also between  $SS(i)$  and  $J(i)$ .

So, it is possible to affirm that a great level of participation (represented by  $SS$ ) implies in general a good level of reification (represented by  $R$ ) and, consequently, it leads to a better evaluation of the whole learning activity.

*if  $SS(i)$ ,  $R(i)$  so:  $J(i)$  (in general)*

It is obvious that more data are necessary to obtain more significant conclusions.

## 5. Discussion of findings

After the data presented in the previous paragraph, it is necessary to put some questions for a further analysis about the observed processes:

- a) why  $R(i)$  and  $SS(i)$  are not always correlated, and when they are correlated the nature of correlation is weak ( $p=0,08$ )?
- b) what are the possible reasons of the inverse correlation ( $p=-0,86$  and  $p=-0,89$ ) happened in some cases between  $R(i)$  and  $SS(i)$ ?
- c) Although  $R(i)$  and  $J(i)$  represented different kinds of judgement (the former about the multimedia and completeness of the artifact and latter the general evaluation about the interrogation of the author's artifact), they are correlated. Why?
- d) When  $R(i)$  and  $J(i)$  are not correlated and why?

### 5.1 About correlation between reification and sociometric status

About a) e b) questions, it is the Wenger's theory itself which can offer a possible explanation: given that participation and reification are dual processes and each of them cannot be representative of the whole meaning negotiation activity, it implies that reification includes a part of participation activity and vice versa; so, in presence of significant meaning negotiation activity, the correlation between  $SS(i)$  and  $R(i)$  is probable, but it is not a certainty, because even if  $SS(i)$  is high or vice versa, the other process can also be not productive owing to the quality of collaboration and the exchanges within the group/community. When  $SS(i)$  or  $R(i)$  taken alone are high, it is not equivalent to affirm the existence and the effectiveness of underlying meaning

negotiation activity. In some cases  $SS(i)$  and  $R(i)$  can be inversely correlated for the same reason: an high level of participation does not imply, taken alone, that the learner will produce good reification. It is also true the inverse observation: a good reification can not imply an high level of participation automatically.

The weakness of the positive correlation, which is recorded in the major part of the cases, is justified by the evanescent nature of the dual processes: we cannot observe all the processes within the community, because part of them are intangible and can even happen outside the VLE itself among learners; so it is possible to affirm that, in general, the role in social reticle and the reification are correlated, with some exceptions.

### **5.2 About correlation between reification and the external general evaluation**

About the c) and d) questions it is necessary to specify the nature of both the parameters.  $R(i)$  is the subjective judgement about several aspects of the multimedia artifacts made by teachers/students, according to a specific evaluation rubric that was known for all the authors before the beginning of the activity.  $J(i)$  instead represents a sort of complete and general evaluation of the results deriving from the activity: so, it includes the evaluation about informal production and exchanges among learners, but it is calibrated on the visible and complex results that each learner can show through an interrogation about the chosen theme.  $R(i)$  and  $J(i)$  are not the same thing, but  $J(i)$ , in a certain sense, includes  $R(i)$ . So, it is obvious that  $R(i)$  and  $J(i)$  can be correlated in probabilistic terms.

In some cases this correlation does not happen: in other terms, what happens between  $R(i)$  and  $J(i)$  is a direct consequence of the relationship between  $SS(i)$  and  $R(i)$ . Although an high level of participation can imply an higher level of  $R(i)$ , it can also be wrong when something within the meaning negotiation process goes wrong; so, even between  $R(i)$  and  $J(i)$  is highly probable a correlation, but it can happen that the reification (which is not alone a proof of the negotiation effectiveness) is not representative of a good learning.

## **6. Conclusion**

The paper presented a brief analysis of the behaviour of two different informal groups, working in a free way without the supervision of a tutor, in order to investigate the possible correlation between participation and reification processes.

The informal contexts and the analysis of both the processes involved in meaning negotiation confirmed that, in general, participation and reification are correlated positively. Besides, in general, the more a learner participates online, better he will produces appreciated reifications and, in probabilistic terms, in presence of high levels of participation (and therefore of reification) his/her total learning (that is formal and informal learning, at the end of the experience) will be of better quality than in other conditions of participation or reification. The Wenger's theory of community of practice seems to be confirmed by this empirical study, but it is necessary to make more researches about this theme, with an higher number of subjects and monitoring

the finality of learning through the introduction of an e-portfolio, in order to have more data correlated with the development of reification processes in the time.

The paper opens possible scenarios for further researches in formal settings and in the knowledge of meaning negotiation dynamics' related to various kind of assigned tasks (for example collective or individual task) and time spent in the productions (for example: will the informal group' structure remain the same for a longer period of observation or not?).

## 7. Acknowledgments

The author thanks Prof. Giuseppe Refrigeri, Full Professor of Didactics in University of Cassino (Italy) for his disposability in putting him in condition to operate within the Master Course "La Professionalità del docente e del dirigente" from which illustrated data were collected. The author also thanks all teachers of Master Course (and their students), as members of the samples, who gave their availability for this study.

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INFORMAL CONTEXT'S GROUPS OF STUDENTS ANOTHER PROOF OF EXISTING CORRELATION (N=32)					
Group of	SS(i) average	SS(i) variance	correlation between SS(i) and R(i)	correlation between SS(i) and external judgement J(i)	correlation between R(i) and external judgement J(i)
Mortisia	3,8	6,3875	-0,868158887	-0,078081003	0,441261304
Papillon	19,6	31,45625	0,650977182	-0,133909115	0,134839972
Linam	6,5	10,6875	0,166794364	0,886310304	0,01805657
Kikka	7	3,59375	0,153684188	0	0,24469154
Nigipa	2,6	0,3625	-0,890765201	0,355930691	-0,662122192
Stef	5,7	2,54375	0,461103483	0,36802481	0,431331093
Flox	8,666667	2,333333	0,928571429	0,5	0,785714286
<b>No Existing leadership</b> , because SS(i) variance not is = or higher than double SS(i) average					
		<i>average of p results between SS(i) and R(i)</i>	0,086029508		
			<i>average of p results between SS(i) and J(i)</i>	0,271182241	
				<i>average of p results between R(i) and J(i)</i>	0,199110367

Table 2