Edited by Pierpaolo Limone & Michele Baldassarre

ICT in Higher Education and Lifelong Learning

Proceedings
November 14th-15th, 2013
Bari (Italy)

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Università di Foggia

Università degli Studi di Bari Aldo Moro

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ISBN 978-88-6194-227-1

Progedit – Progetti editoriali srl, Bari (Italy)
Via De Cesare 15 – 70122 BARI
Tel. 0805232627
Fax 0805237648
www.progedit.com
e-mail: info@progedit.com

Published in 2014

Edited by Limone Pierpaolo,
Baldassarre Michele

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SIREM 2013 Conference Proceedings

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Limone, P., & Baldassarre, M. (Eds.) (2014). *ICT in Higher Education and Lifelong Learning*. *SIREM 2013 Conference Proceedings, November 14th-15th, Bari (Italy)*. Bari: Progedit.

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Introduction

Pierpaolo Limone
University of Foggia
pierpaolo.limone@unifg.it

Michele Baldassarre
University of Bari
michele.baldassarre@uniba.it

The present proceeding collects twenty-seven papers exposed during the scientific meeting SIREM 2013 "ICT in Higher Education" held on November 14th and 15th, 2013 in Bari, Italy.
There are another ten full papers presented at the conference that were collected within the Volume VI, no. 1, June 2014 of REM - Research on Education and Media Journal.
The conference engaged in an interesting interdisciplinary debate about the role of technology in higher education and lifelong learning, presenting an accurate analysis on new strategies for instructional design, innovative teaching approaches methods, and effective assessment systems.
The conference also enabled SIREM scholars to collect the state of the art of the Italian scientific research and the best teaching experiences on the following topics:

- Technologies in higher education
- Digital skills and lifelong learning
- Technological innovation and vocational training
- Digital literacy and adult education
- Technologies for lifelong learning
- Innovative methods and techniques for e-learning
- Models and assessment tools of e-learning
- Mobile learning environments (M-learning) for adult education
- Social learning and lifelong learning.

The conference has been a very important scientific event to establish a dialogue among scholars from several Italian universities. During the conference, they met to examine and discuss emerging issues in the educational field, presenting different but complementary points of view and studies, aiming to map an evolving scene.
This proceeding is divided into three main sections, representing three categories in which contributions were organized during the conference:

- *Full Paper*: contributions referred to results of an original research work.
- *Short Communication*: information about research projects not fully completed.
- *Experience*: innovative educational experiences.

All contributions collected here represent an important record of the interesting ongoing research courses and live cultural debate around educational technology and media education in the national scientific context. In addition, many of the researches presented here demonstrate how collaboration and openness to international environments can bring significant benefits in terms of intercultural development, in order to weave paths with unprecedented and innovative thinking.

Diana Laurillard, a scholar from the Institute of Education in London, participated in the conference with her keynote presentation "*Teaching as a design Science: investigating the integration of technology with pedagogy*" and with this contribution opened the space for international research and reflection about innovative strategies in learning design.
The annual conference organized by SIREM represents a fruitful discussion about new frontiers on media research in the national and international scene with a significant openness to innovative lines and research horizons.

Section 1
Full Paper

Limone, P., & Baldassarre, M. (Eds.) (2014). *ICT in Higher Education and Lifelong Learning*. *SIREM 2013 Conference Proceedings, November 14th-15th, Bari (Italy)*. Bari: Progedit.

Digital storytelling: social dynamics and participation paths[1]

Michele Baldassarre
University of Bari
michele.baldassarre@uniba.it

Immacolata Brunetti
University of Bari
imma.brunetti@gmail.com

Maria Brunetti
Primary school teacher, Bari
mariella.brunetti@gmail.com

Abstract
Interactive technology environments are a resource for both students and teachers. Through these interactive contexts, learning acquires complexity as it is not only the result of individual cognitive processes, but also of interactive and communicational dynamics that exceed the centrality of the process of transferring content.
The research focuses on the participatory dynamics generated by the use of digital storytelling within two primary school class groups (40 students in total) in Bari, with particular attention to the participation paths created within the learning community. Using a qualitative version of the Social Network Analysis we intend to investigate the interactive dynamics of the two groups and then compare the results. The results are expected to show how meaningful learning takes place through social and cultural dynamics (Wenger, 1998), influenced by the context in which knowledge is built.

Keywords
Digital Storytelling, Social Dynamics, Interactions, Social Network Analysis, Community of Practice

1. Theoretical Framework

The proposed contribution aims to investigate the participative interaction that is established within the class through the use of educational technology. The argument starts from the premise that the use of well-designed technology should facilitate students' interaction and participation. Within this objective, digital storytelling as a technological teaching tool fits very well in a context in which participation and interaction are keys to building knowledge (Scott, 1977, pp. 7-10). The cultural perspective helps us to rethink learning processes enabling complex interactive and communicational dynamics that foresee the outline of the social dimension of the learning process. The purpose of learning development is for students to become active participants in their own cultural and social context. For this reason,

[1] This article has been developed jointly by the three authors. **Michele Baldassarre** wrote paragraphs 1.2, 2; **Immacolata Brunetti** wrote paragraphs 1, 3; **Maria Brunetti** wrote abstract and conclusions.

monitoring how participants modulate their placement within the community of practice is an indicator of both individual and social learning. The study of participation paths is fundamental in order to analyse the central or peripheral processes of each participant.
In this reflection, the context is a system internally composed by different elements that interact and produce changes when only a single component varies. According to the Gestalt theory (Lewin, 1951), the behaviour of a group must be seen as determined by the field of social forces in which the group itself is located; for this reason, the environment within which the group is placed is not seen as something external, but as something that really involves the members, thus, the name "perceived environment", since the social meaning is actively constructed by the group members on the basis of their perceptions and experiences (*ibid.*). The recent interest in the environment as a place for meaning construction makes it necessary to consider this combination, which for this purpose calls attention to the use of technology in order to motivate the students' participation and the formation of the class as a learning community. Communities of practice arise when individuals belonging to a group perform a certain task and share the conditions for their existence in an inter-subjective space (Wenger, 1998). This inter-subjective space is characterized by three fundamental dimensions: joint venture, mutual commitment and sharing of the conditions. It is through these three dimensions that the process of collective negotiation, requiring mutual commitment of all the participants, takes place. As a matter of fact, belonging to a community means sharing a commitment and participating in the construction of a task through interactions. It is necessary that all participants share the same commitment and are aware of it. The mutual commitment is fostered by working in the same physical space, sharing information and experiences through the narrations of the individuals. Wenger (*ibid.*) identifies three devices that form the backdrop to mutual commitment, that is, cooperative work, diversity and mutual relationships. Fundamental to negotiating meanings are mutual commitment to the task and sharing objectives that give shape to the enterprise. The final result produces a type of learning which is culturally and socially defined during the interactions (Gherardi, Nicolini & Odella, 1997). The concept of communities of practice finds its counterpart mainly in training contexts in the classroom and in virtual environments.
Telling and listening to stories are at the heart of human experience and are an integral part of an individual's life, besides making up the fabric of cultural and ethical subjectivity. Stories can be considered as an inseparable encounter between tacit knowledge and practical action which stem from the construction of a group's and a community's social identity (Bruner & Feldman, 1995). Within the different stages of a story and throughout the experiences of the different actors in which decisions and actions overlap, stories give life to complex relationships that make the vision of reality consistent with subjective interpretations, a fact that could hardly be explained by the rational component alone (Bruner, 1997). Thanks to narratives it is possible to construct and deconstruct observational perspectives that reflect the idea the subject has of himself as an individual immersed in a global existential structure in which competing social, cultural, ethical considerations govern the foundation of a community.
Taking advantage of the potentialities of the pedagogical and didactic narration, both as a tool for communicating experiences and as a reflective tool for the construction of meanings of reality (Kaneklin & Scaratti, 1998), digital storytelling is at the heart of a dimension in which the multimedia, characterized precisely by linguistic complexity, contributes to enrich communication. In this context, the act of narration is intermingled and blends deeply throughout multiple forms belonging to the cultural plot (Barthes, 1987).

Many studies have shown the importance of such a methodology in developing the empowerment of the individual (Drury & Alterio, 2003; Petrucco & De Rossi, 2009, 2013). For this reason, digital storytelling is not only a multimedia product, but a proper teaching and learning process, a part of a tissue made up of actors, technological artefacts and precise educational intentionality (Petrucco & De Rossi, 2009; 2013). And it is precisely within the context of digital literacy that the new pedagogical proposals foster the development of creativity and innovation (Burgess, 2006).

1.1 Storytelling and active learning

Several studies have been conducted to prove the importance of storytelling in teaching and learning processes, in fact, storytelling has always been an important element in teaching. If we consider the relational aspects of teaching practice, we can say that narration and dialogue are based on the cognitive and emotional involvement of the participants in the communication process (Cisotto, 2005). As a consequence we have, on the one hand, the attempt to construct meaning through continuous negotiations, on the other, the focus on motivation to learn through active and experiential teaching based on the development of skills (Scank, 2011). In this context, the effectiveness of teaching and learning processes is all the greater because the inherent narrative modes are linked to the actual experience. Mc Drury and Alterio (2003) consider storytelling as an active element and bearer of real content and meaningful experiential reality since it helps to contextualize what has been learned and reflect upon it. Jonassen (cfr. Varisco, 2002) identifies three poles around which the learning process is understood as a meaningful construction: the context which determines it, the interaction between the actors based on a partnership intended as a cognitive process, and finally the inner negotiation. The narrative paradigm qualifies reflection as an opportunity to rework the experience and the knowledge in relation to cognitive and emotional processes. By means of this process, not only a meaningful based on experience learning (the so-called learning by doing) takes place (Kolb, 1984), but also a transformative learning (Mezirow, 2003) since, at the end of the reflective process, thought and subsequent action undergo a transformation. Howard Gardner (1999) in his *Sapere per comprendere*, argues that the narrative approaches to teaching harmonize and develop the various forms of intelligence (especially linguistic, interpersonal, intrapersonal). Storytelling itself is an unconscious communicative strategy because it is part of the way we communicate. Indeed, some authors, such as Arahamson (1998) and Egan (1989), claim that a teacher naturally uses narrative strategies that become more and more effective if the subject taught is bound to real events.
The narrative perspective is found in Problem Based Learning (Barrow, 1996; Woods, 2005; Gasser, 2011), where teaching is anchored to practical problems related to children's daily life. This perspective facilitates the process of learning the abstract content related to the context, since this content is resized in its emotional aspects and acts as a stimulus for learning motivation in relation to a specific content. The basic elements that characterize a story are recounting in an active and engaging way, and, as Schank claims, the recognition of a problem and the necessity to explicit its meaning through narration. Digital storytelling embraces both the cognitive and the emotional dimension of the learning process, becoming, thus, an instrument through which education can be provided within the ultimate goal of the whole teaching process.

Therefore, the constructivist approach related to the use of DST is based on participation and interaction that are most important for building and sharing knowledge (Ligorio & Cacciamani, 2013).

2. Research design: methodological framework

The study herein proposed, launches a discussion on the basis of a research (Baldassarre, Brunetti & Brunetti, 2013) carried out during the school year 2012-2013, and presented at the Atee-Sirem Conference in Genoa 2013, on the use of digital storytelling as a tool to improve the perception of the level of understanding, attention, memory, and on the effectiveness of a lesson which uses multimedia narrative strategies in order to encourage students to reflect critically on the use of new technologies by means of a methodology adaptable to children's personal interests and somehow interdisciplinary.
Therefore, we thought of a narrative method and a story that was not only common to all the children in the class, so as to form a single group, but also emotionally engaging, that is, motivated to collaboration, sharing and construction of meanings. The assumption is that the mixture between narrative and emotional aspects mixed with multimedia components, enhances the effects of the perceptual-cognitive interpretation of reality. Thus, we proceeded to extend the search at a later stage where the context becomes central in the development of involvement and commitment in the performance of a shared repertoire. The design of the research involved, the use of digital storytelling as a tool that encourages collaborative work, sharing and the construction of meanings. The tools used by the students were the following four: a digital camera; freeware software to perform editing operations such as Picasa; an audio editor, Audacity, and finally Photostory 3 to animate, create effects and add titles to photos. The result is a video with pictures taken in class, drawings created by the children and an audio commentary. The video was made by a single working group that identified a specific known topic, lived in first person. The chosen theme revolved around the story of Little Red Riding Hood narrated in the English language since the content of the fairy tale is known to all students. The lesson setting was that of the computer laboratory. The most significant aspect recorded concerned the teacher's role, who, thus, becomes a cultural mediator and facilitator, besides supporting the whole teaching and learning process (Jonassen, 2002). The content of the narration is characterized by the reflection which stems from the real action thus created. Furthermore, this allows to reflect on the solution to possible issues which may arise and, as a result, thought processes are explicated and metacognition can be practiced. The reference is precisely to the experiential learning theorized by Kolb (1984) according to whom learning is significant if it is characterized by the reflection triggered by experience, and by social interactions as a factor in the renovation of thought (Salomon, 1993). It follows that, learning is constituted by a sequence of steps or activities which culminate in a reflective change within real action. The key element of this process is the emotional component that makes the story interesting and worthy of attention. The emotional envolvement focuses on interpersonal activity, on mutual commitment in which the activity are always collective activity; so the analysis of participation paths is implement to student.
The research question aims at investigating the interactive dynamics within a community of practice. In particular, the research aims at identifying and comparing the strategies of participation in two different lesson modes. The first lesson mode does not make use of digital storytelling, the second makes use of the digital tool.

The research data will be organized on the basis of the interaction of two groups from primary school fifth classes (40 students in total). Each group (20 students) will be taught the English language through the use of narration. In a subsequent phase, English will be taught traditionally in one class, whilst in the other English will be taught via digital storytelling; hence, the participation of and the interaction between students shall be analysed both at the beginning and at the end of this study. This is crucial to the investigation of the relationship networks within the community of practice and expresses the contribution of participations paths to the collective structure (Annese & Traetta, 2009). Ligorio (2008) establishes 4 types of participation paths:

- *stable*: same level of participation
- *progressive centralization*: constant movement from the margins to the centre
- *progressive decentralization*: centrality, marginality
- *nonlinear stability*: an initial decentralized path, thus, from the centre to the margins and a subsequent change in direction, or, vice-versa, an initial centralization (from the margins to the centre) and then a decentralization (centre-margins).

Well (1993) and Matusov (2001) have investigated inter-subjectivity by observing how individuals cooperate when they manage to perform common tasks. Wells talks about the convergence of attention on an object, in the quest for a common reference, in negotiating the meaning of words and purpose of the interaction and finally in listening to one another. Matusov, however, defines inter-subjectivity as having something in common with each other, when trying to converge one's views with those of the others, and when individual differences are used as essential resources for independent learning.

On the basis of the digital storytelling structural elements identified by Jason Ohler (2008) intertwined with the DST learning model of Mc Drury and Alterio (2003), the research consisted in the following phases:

1. presentation of the project to the class;
2. performing the written part;
3. collection of materials and single composition with the use of a PC.

Element for the planning of the digital Storytelling (Jason Ohler)	Model of reflective learning through Storytelling (McDrury & Alterio)
1. Story and construction of its concept map.	1. Story finding: identifying a story.
2. Feedback from other students on their story with additional comments	2. Story telling: debating of story.
3. Writing and recording the story.	3. Story Expanding and Story processing: correlation with other stories and changes in thoughts
4. Listening and possible reviewing, explaining the end of the story and digitalizing it	4. Story reconstructing: changing the action through a reconstruction process

FIGURE 1. Overview of the elements for the planning of DST(Digital StoryTelling). Jason Ohler (2008) intertwined to the learning model of McDrury and Alterio (2003).

Following the presentation of the project, was the performance of the written part which intertwined the following elements with each step:

1. storytelling and construction of a concept map: collecting story activities (Story Finding) and identifying key points;
2. discussion of stories with common elements (Story Telling);
3. correlation with other stories to enrich the content (Story Expanding) and writing of the storyboard (Story Processing);
4. reconstruction of the final story with possible solutions through a reworking that points to a positive change in thought and action (Story Re-constructing).

During the sharing, summarizing and drawing phases of the story, the teacher changed the position of the children around so that each child could correct his/her classmate's work. The reason for changing positions stems from the necessity to keep up the pace for the cooperative task, other than for the use of the tool; in such a way the fastest child could help the one who worked at a slower pace.

Before the implementation of the Digital Storytelling, data was collected accordingly to a question in two different phases, *pre-design* and *post-design* of digital storytelling: "Choose among your classmates the ones you consider mostly to be your friends by giving them a point from 1 to 5 – 5 being the maximum score and 1 the minimum".

3. Data Analysis

Through the Social Network Analysis (SNA) (Borgatti, 1998; Mazzoni, 2006; Wasserman & Faust, 1994), we intend to analyse relational data that will derive from qualitative methods including:

- the density index to investigate the level of cohesion among the participants,
- the centrality index to investigate the position of each student and his social power.

In the first phase of the research we gave out the socio-metric test to both classes.

In this study, we intended to combine the relational data derived from the socio-metric tests with the quantitative analysis via network analysis (NA). Several national and international studies have shown how this approach can be adequate to study the interconnections between the actor and his/her social relationships (Amaturo, 2003; Burt, 1990, 1992, 2000; Borgatti, 1998; Piselli, 2001, 2003; Salvini, 2007; Scott, 1991).

Network analysis techniques have made it possible to translate the social space within the relationships, this is because it is assumed as a precondition that the shape and structure of this space depends on the characteristics of the actors involved, as determined by the actors' recognition of their own action strategies based on their own resources and by external conditions used to their advantage (Fligstein, 2001). The use of the NA is very useful when you want to make assumptions about the relational processes practiced by the actors in their professional context. In this framework it is possible to take advantage of the opportunities created by the various situations on the basis of the resources possessed by everyone and the strategies that are put into practice and will determine some of the choices. These choices depend both on the professional skills and on the authoritativeness enjoyed by the actor within the network, highlighted by the position that the actor holds within the network (Holcombe, 2002). On this basis, an ego-network has been conducted in order to activate a space comprised within the relationships assuming that the shape and space mutate accordingly to the characteristics of the actor in reason of the intensity of the relationship and consequently in accordance with the changes in position over time (Chiesi, 2003; 2005). The tools used to process the data were: UCINET and NetDraw. Ucinet (Borgatti, 1998) was created by a research group at the University of California, Irvine, and is constituted by a series of

programs that follow the graph theory, the analysis of positional and multidimensional scaling. A file data Ucinet is represented by a matrix of incidence or adjacency, made up of values transformed into binary data. Net Draw is a procedural module used to graphically create social networks, and thus to calculate the analysis of distance and centrality, and finally it is used for the construction of geodesic matrices.

Below the diagram of social networks within the classroom setting (Figure 2-3).

BLOCK DENSITIES OR AVERAGES
Input dataset: classe 5B dico
Relation: classe 5B dico
Density (matrix average) = 0.4907
Standard deviation = 0.4999
Use MATRIX>TRANSFORM>DICHOTOMIZE procedure to get binary image matrix.
Density table(s) saved as dataset Density
Standard deviations saved as dataset DensitySD
Actor-by-actor pre-image matrix saved as dataset DensityModel

Running time: 00.00.01
Output generated: 30 mar 14 18.08.42
UCINET 6.509 Copyright (c) 1992-2012 Analytic Technologies

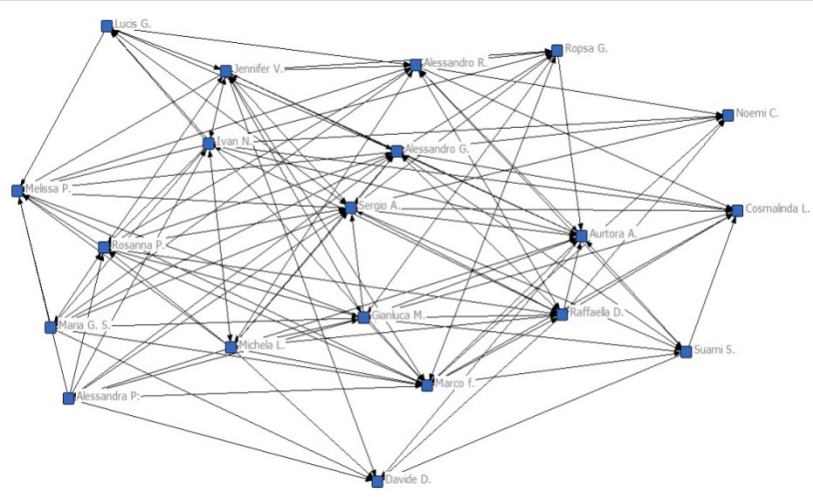

FIGURE 2. Relational networks of class 5 B before using DST (Digital StoryTelling).

This socio-metric network represents the relationships existing within the class. Each relationship is represented by a pointing arrow which shows single preferences towards the chosen classmate, thus defined as an asymmetric relationship.

FREEMAN'S DEGREE CENTRALITY MEASURES
Model: asymmetric
Input dataset: classe 5B dico

		1 - OutDegree	2 - InDegree	3 - NrmOutDeg	4 - NrmInDeg
7	Alessandro G.	14.000	8.000	73.684	42.105
2	Sergio A.	13.000	13.000	68.421	68.421

		1 - OutDegree	2 - InDegree	3 - NrmOutDeg	4 - NrmInDeg
6	Marco F.	12.000	12.000	63.158	63.158
10	Michela L.	12.000	6. 000	63.158	31.579
5	Raffaella D.	12.000	8.000	63.158	42.105
17	Alessandro R.	12.000	8.000	63.158	42.105
13	Ivan N.	11.000	7.000	57.895	36.842
20	Jennifer V.	11.000	8.000	57.895	42.105
15	Rosanna P.	9.000	11.000	47.368	57.895
14	Alessandra P.	8.000	3.000	42.105	15.789
12	Gianluca M.	8.000	9.000	42.105	47.368
18	Suami S.	8.000	4.000	42.105	21.053
8	Ropsa G.	7.000	6.000	36.842	31.579
1	Aurtora A.	7.000	11.000	36.842	57.895
9	Lucis G.	5.000	5.000	26.316	26.316
19	Maria G. S.	5.000	7.000	26.316	36.842
11	Cosmalinda L.	4.000	7.000	21.053	36.842
16	Melissa P.	0.000	12.000	0.000	63.158
4	Davide D.	0.000	7.000	0.000	36.842
3	Noemi C.	0.000	6.000	0.000	31.579

DESCRIPTIVE STATISTICS

		1 - OutDegree	2 - InDegree	3 - NrmOutDeg	4 - NrmInDeg
1	Mean	7.900	7.900	41.579	41.579
2	Std Dev	4.312	2.663	22.693	14.014
3	Sum	158.000	158.000	831.579	831.579
4	Variance	18.590	7.090	514.958	196.399
5	SSQ	1620.000	1390.000	44875.348	38504.156
6	MCSSQ	371.800	141.800	10299.169	3927.978
7	Euc Norm	40.249	37.283	211.838	196.225
8	Minimum	0.000	3.000	0.000	15.789
9	Maximum	14.000	13.000	73.684	68.421
10	N of Obs	20.000	20.000	20.000	20.000

Network Centralization (Outdegree) = 33.795%
Network Centralization (Indegree) = 28.255%
Actor-by-centrality matrix saved as dataset Freeman degree

Running time: 00.00.01
Output generated: 30 mar 14 18.10.41
Copyright (c) 2002-12 Analytic Technologies

Density is the main indicator of the degree of cohesion related to the network: the Output Log File shows a value of density of 0.49, which means that there are 49% of all possible ties. It is an average value, as the index varies from 0 to 1, allowing us to observe that there is a good level of cohesion in only one half of the class. The value of cohesion is confirmed by the

value of the deviation standards that is 0,50 which indicates the presence of a fairly high amount of variability in the bonds. It represents the highest variability as the density is close to 0.5.
The freeman degree centrality: looking at our network we can see that the node #2, #6 and the node #16 received the highest number of choices (respectively 13, 12 and 12 choices), these are, as a matter of fact, the most popular pupils in the class; the nodes #15 and #1 are quite central (11 choices); the nodes #7 and #2 are those with the highest value of out-degree, i.e. the most expansive. The more peripheral children are those who received the lowest number of choices: #14, #18 and #9.
In this class a good level of cohesion may be observed: ties are numerous and more homogeneous. In some points, you will find that the meshes of the net thicken around those subjects deemed as the most influential and central. These subjects are able to reach the largest number of subjects within the network through short paths. On the other hand, there are some more peripheral nodes from which bonds are originated with no return. Gianluca is a child who shows off, Swami is a socially disadvantaged child and for this reason she is marginalized, she constantly quarrels with everyone, and creates situations of social reality. She is always at the centre of attention and prevails in class interactions, since she imposes her presence.

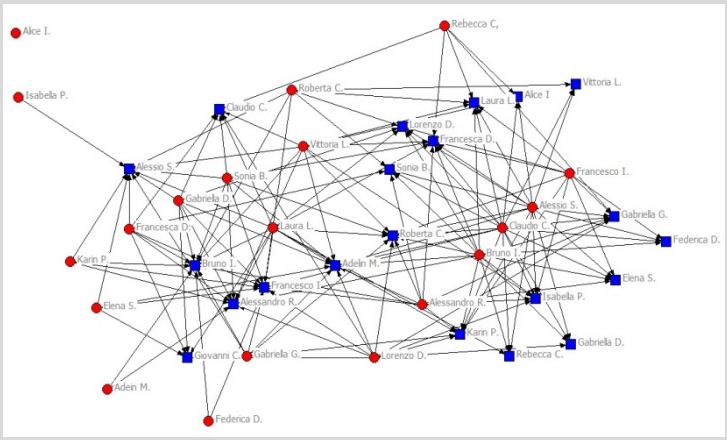

FIGURE 3. Relational networks of class 5 C before using DST (Digital StoryTelling).

BLOCK DENSITIES OR AVERAGES
Input dataset: netdraw classe 5C
Relation: netdraw classe 5C
Density (matrix average) = 0.3750
Standard deviation = 0.4841
Use MATRIX>TRANSFORM>DICHOTOMIZE procedure to get binary image matrix.
Density table(s) saved as dataset Density
Standard deviations saved as dataset DensitySD
Actor-by-actor pre-image matrix saved as dataset DensityModel

Running time: 00.00.01
Output generated: 30 mar 14 16.13.38
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CLOSENESS CENTRALITY MEASURES
Input network dataset: netdraw classe 5C
Output measures: freeman degree
(Freeman) Set undefined distances to: Max observed distance plus 1
(Freeman) Output options: Divide totals into N-1 (Freeman normalization)
(Valente-Forman) Handle undefined distances:Set reverse distance to zero
(Valente-Forman) Output options: Divide averages by diameter
(Reciprocal) Handle undefined distances: Set reciprocal distance to zero
(Reciprocal) Output options: Averages

		1 - OutFree Clo	2 - InFree Clo	3 - OutVal Clo	4 - InVal Clo	5 - OutRecip Clo	6 - IRecip Clo
1	Vittoria L.	0.679	0.487	1.000	0.947	0.763	0.535
2	Gabriella G.	0.576	0.576	1.000	0.947	0.649	0.658
3	Lorenzo D.	0.655	0.576	1.000	0.947	0.737	0.658
4	Alessio S.	0.826	0.594	1.000	0.947	0.895	0.719
5	Bruno I.	0.792	0.633	1.000	0.947	0.868	0.754
6	Francesco I.	0.633	0.655	1.000	0.947	0.728	0.781
7	Roberta C.	0.613	0.633	1.000	0.947	0.684	0.737
8	Adein M.	0.475	0.655	1.000	0.947	0.518	0.763
9	Alessandro R.	0.655	0.594	1.000	0.947	0.754	0.702
10	Rebecca C	0.576	0.528	1.000	0.947	0.632	0.579
11	Gabriella D.	0.613	0.528	1.000	0.947	0.684	0.579
12	Sonia B.	0.633	0.559	1.000	0.947	0.711	0.632
13	Karin P.	0.543	0.594	1.000	0.947	0.596	0.684
14	Elena S.	0.528	0.543	1.000	0.947	0.570	0.605
15	Alice I.	0.250	0.500	0.000	1.000	0.000	0.570
16	Francesca D.	0.594	0.613	1.000	0.947	0.658	0.711
17	Isabella P.	0.463	0.576	1.000	0.947	0.491	0.658
18	Laura L.	0.704	0.576	1.000	0.947	0.789	0.658
19	Federica D.	0.475	0.528	1.000	0.947	0.518	0.579
20	Claudio C.	0.864	0.487	1.000	0.947	0.921	0.605

20 rows, 6 columns, 1 levels.

Running time: 00.00.01 seconds.
Output generated: 30 mar 14 16.40.46

Density is the main indicator of the degree of cohesion related to the network: the Output Log File shows a value of density of 0.37, which means that there are 37% of all possible ties. It is a rather low value, as the index varies from 0 to 1, allowing us to observe that there isn't a good level of cohesion in this class; however, the value of cohesion is confirmed by the value of the deviation standards that is 0,48 which indicates the presence of a fairly high amount of variability in the bonds. It represents the highest variability as the density is close to 0.5.
This second figure represents a mesh with non-homogeneous ties, like the previous one, in which the use of digital storytelling was given. The red dots are the nodes from which the ties

depart, while the blue ones receive them: there are in fact 18 red nods and 21 blue ones. In this class there are a few peripheral nodes; though apparently it may seem to be a homogeneous class, there are nonetheless few influential nodes as some nodes have many links, but in turn are connected to few nodes, or from one particular node no links depart but in turn are received.

In the second phase of the research we gave out the socio-metric test to both classes after using the digital storytelling.
Below the diagram of social networks within the classroom setting (Figures 4-5).

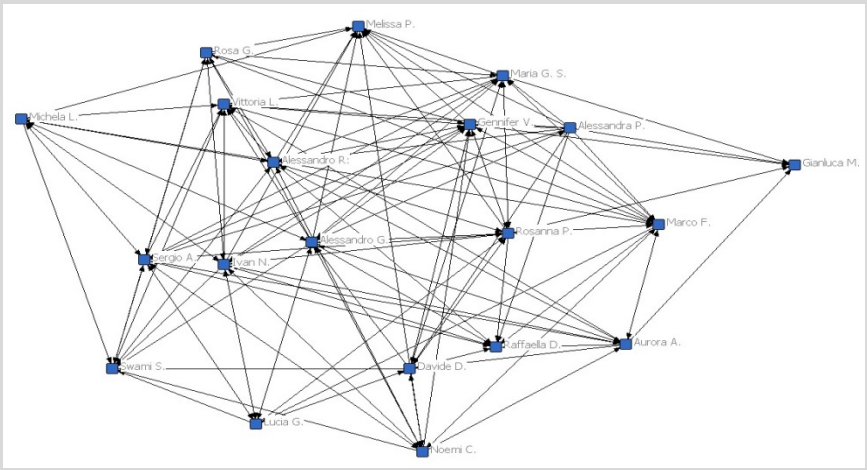

FIGURE 4. Relational network with traditional teaching in class 5B.

BLOCK DENSITIES OR AVERAGES
Relation: classe 5B dico
Density (matrix average) = 0.4803
Standard deviation = 0.4996
Use MATRIX>TRANSFORM>DICHOTOMIZE procedure to get binary image matrix.
Density table(s) saved as dataset Density
Standard deviations saved as dataset DensitySD
Actor-by-actor pre-image matrix saved as dataset DensityModel

Running time: 00.00.01
Output generated: 31 mar 14 23.33.21
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CLOSENESS CENTRALITY
Input dataset: classe 5B dico
Method: Geodesic paths only (Freeman Closeness)
Output dataset:closeness
Note: Data not symmetric, therefore separate in-closeness & out-closeness computed.

The network is not connected. Technically, closeness centrality
cannot be computed, as there are undefined distances.
-- You have chosen to set undefined distances to N, the number of nodes

CLOSENESS CENTRALITY MEASURES

		1 - inFarness	2 - outFarness	3 - inCloseness	4 - outCloseness
15	Melissa P.	81.000	380.000	23.457	5.000
20	Vittoria L.	81.000	380.000	23.457	5.000
5	Raffaella D.	83.000	380.000	22.892	5.000
11	Gianluca M.	89.000	380.000	21.348	5.000
2	Sergio A.	100.000	28.000	19.000	67.857
19	Gennifer V.	100.000	28.000	19.000	67.857
17	Swami S.	101.000	42.000	18.812	45.238
16	Alessandro R.	101.000	36.000	18.812	52.778
14	Rosanna P.	101.000	27.000	18.812	70.370
7	Alessandro G.	102.000	25.000	18.627	76.000
18	Maria G. S.	102.000	28.000	18.627	67.857
12	Ivan N.	103.000	27.000	18.447	70.370
6	Marco F.	104.000	28.000	18.269	67.857
1	Aurora A.	104.000	29.000	18.269	65.517
4	Davide D.	105.000	31.000	18.095	61.290
3	Noemi C.	106.000	28.000	17.925	67.857
8	Rosa G.	107.000	32.000	17.757	59.375
10	Michela L.	107.000	32.000	17.757	59.375
9	Lucia G.	107.000	32.000	17.757	59.375
13	Alessandra P.	116.000	27.000	16.379	70.370

Statistics

		1 - inFarness	2 - outFarness	3 - inCloseness	4 - outCloseness
1	Minimum	81	25	16.379	5
2	Average	100	100	19.175	52.467
3	Maximum	116	380	23.457	76
4	Sum	2000	2000	383.499	1049.345
5	Standard Deviation	9.077	140.047	1.937	24.653
6	Variance	82.400	19613.301	3.750	607.791
7	SSQ	201648	592266	7428.590	67212.086
8	MCSSQ	1648	392266	75.009	12155.815
9	Euclidean Norm	449.052	769.588	86.189	259.253
10	Observations	20	20	20	20
11	Missing	0	0	0	0

11 rows, 4 columns, 1 levels.

Network centralization not computed for unconnected graphs
Output actor-by-centrality measure matrix saved as dataset closeness

Running time: 00.00.01
Output generated: 31 mar 14 23.35.16
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Density is the main indicator of the degree of cohesion related to the network: the Output Log File shows a value of density of 0.48, which means that there are 48% of all possible ties. The value is located in the central point, as the index varies from 0 to 1, which allows us to observe that there isn't a good level of cohesion in the class; however, the value of cohesion is confirmed by the value of the deviation standards that is 0,49 which indicates the presence of a fairly high amount of variability in the bonds. It represents the highest variability as the density is close to 0.5.
The freeman degree centrality: looking at our network we can see that the pupil positioned at the centre, that is, the one with the highest value of closeness in regards to the other node, is node 7. Node 17 is a peripheral node, whilst 15,20,5,11 are the most isolated ones in the class. In this figure, the degree of width and cohesion, compared to the beginning of the lesson ,is unchanged. There is, indeed, a high level of variability in the ties and homogeneity.

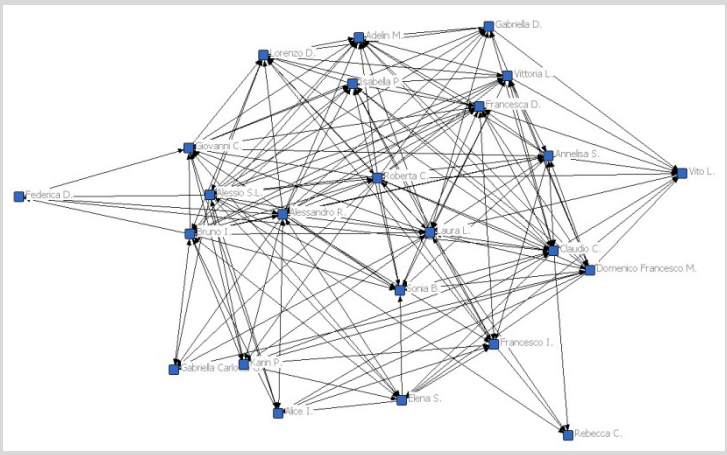

FIGURE 5. Relational network after using digital storytelling in class 5C.

BLOCK DENSITIES OR AVERAGES
Input dataset: classe 5Cdico
Relation: classe 5Cdico
Density (matrix average) = 0.3623
Standard deviation = 0.4807
Use MATRIX>TRANSFORM>DICHOTOMIZE procedure to get binary image matrix.
Density table(s) saved as dataset Density
Standard deviations saved as dataset DensitySD
Actor-by-actor pre-image matrix saved as dataset DensityModel

Running time: 00.00.01
Output generated: 31 mar 14 22.37.02
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Density is the main indicator of the degree of cohesion related to the network: the Output Log File shows a value of density of 0.36, which means that there are 36% of all possible ties. It is

a rather low value, as the index varies from 0 to 1, which allows us to observe that there isn't a good level of cohesion in this class; however, the value of cohesion is confirmed by the value of the deviation standards, that is 0,48, which indicates the presence of a fairly high amount of variability in the bonds. It represents the highest variability as the density is close to 0.5.

CLOSENESS CENTRALITY
Input dataset: classe 5Cdico
Method: Geodesic paths only (Freeman Closeness)
Output dataset: closeness
Note: Data not symmetric, therefore separate in-closeness & out-closeness computed.

The network is not connected. Technically, closeness centrality
cannot be computed, as there are undefined distances.
-- You have chosen to set undefined distances to N, the number of nodes

CLOSENESS CENTRALITY MEASURES

		1 - inFarness	2 - outFarness	3 - inCloseness	4 - outCloseness
2	Rebecca C.	47.000	552.000	48.936	4.167
17	Adelin M.	55.000	53.000	41.818	43.396
15	Laura L.	57.000	33.000	40.351	69.697
6	Francesca D.	57.000	38.000	40.351	60.526
11	Bruno I.	57.000	31.000	40.351	74.194
9	Lorenzo D.	58.000	39.000	39.655	58.974
20	Isabella P.	58.000	46.000	39.655	50.000
3	Giovanni C.	58.000	42.000	39.655	54.762
19	Karin P.	59.000	44.000	38.983	52.273
16	Vittoria L.	59.000	36.000	38.983	63.889
23	Annelisa S.	60.000	34.000	38.333	67.647
1	Sonia B.	61.000	38.000	37.705	60.526
22	Alessio S.L.	61.000	29.000	37.705	79.310
12	Francesco I.	62.000	47.000	37.097	48.936
5	Roberta C.	62.000	29.000	37.097	79.310
21	Alessandro R.	62.000	29.000	37.097	79.310
4	Claudio C.	63.000	30.000	36.508	76.667
14	Vito L.	63.000	46.000	36.508	50.000
8	Gabriella D.	63.000	40.000	36.508	57.500
24	Elena S.	65.000	38.000	35.385	60.526
13	Alice I.	67.000	41.000	34.328	56.098
10	Gabriella Carlotta G.	67.000	46.000	34. 328	50.000
7	Federica D.	68.000	62.000	33.824	37.097
18	Domenico Francesco M.	68.000	34.000	33.824	67.647

Statistics

		1 - inFarness	2 - outFarness	3 - inCloseness	4 - outCloseness
1	Minimum	47	29	33.824	4.167
2	Average	60.708	60.708	38.124	58.436
3	Maximum	68	552	48.936	79.310
4	Sum	1457	1457	914.984	1402.453
5	Standard Deviation	4.632	102.749	3.153	16.093
6	Variance	21.457	10557.373	9.943	258.991
7	SSQ	88967	341829	35121.816	88168.844
8	MCSSQ	514.958	253376.953	238.638	6215.793
9	Euclidean Norm	298.273	584.661	187.408	296.932
10	Observations	24	24	24	24
11	Missing	0	0	0	0

11 rows, 4 columns, 1 levels.

Network centralization not computed for unconnected graphs
Output actor-by-centrality measure matrix saved as dataset closeness

Running time: 00.00.01
Output generated: 31 mar 14 22.40.31
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The freeman degree centrality: looking at our network we can see that the pupils positioned at the centre, that is, the ones with the highest value of closeness in regards to the other node, are node #5 and #21. Nodes #17 and #7 are peripheral, whilst #2 is the most isolated one in the class.
This last figure is the most interesting since it is possible to find a high amount of variability in the ties compared both to the initial stage, i.e., before the use of DST, but also to traditional teaching, which, on the contrary, has a lesser level of variability.
Nevertheless, it is possible to observe a cluster of central ties having consistent shifts, such as, in the case of the student Federica D. who in the initial stage receives links, whereas at the starting point remains at the margins: thus, there is a change in position from central to peripheral. Vito L. becomes a leader because he receives links but does not link to anyone. The analysis shows that there is a good level of cohesion, though there is a fairly high amount of variability in the links.

4. Conclusion

The identified network typology consists of a varying network structure with a density of 0.5, that sets to the center a cohesive cluster of intimate friends and to the periphery a series of superficial bonds. Such structures are shaped based upon the reticular typology where the subgroup density interacts with the peripheries and vice versa (Everett & Borgatti, 2000).

According to the definition of Granovetter (1973) who states that strong relationships result from the combination of the quantity of time, the emotional investment and the intimacy (ivi, p.73), we can consider the central relationships as stronger than the peripheral ones, probably because they are very weak, having been created in the context of reference. We can deduce from this that friendship relations play a fundamental role in the community. In fact, those who were, at the beginning, at the edges of the network, are absorbed towards the centre in the situation following to the use of the DST. Friendship relations do not consider as strangers those who don't belong to it, but as people which it is possible to come into contact with and that represent potentially weak bonds or people towards whom we don't express any interest: people who do not belong to the environment in question, are those who don't share the same interests (Bourdieu, 1992). The investment in friendship does not require a formal apparatus of norms and obligations; in fact friendship relations develops in networks where it's possible to create a collective identity, in which the set of bonds underestimates the importance of the single relationships, whose rules are entirely negotiated within the relationship and the friendship network.

Limits that essentially depend on the type of studied population and on the type of bond based on which it is decided to build the relationships network (Salvini, 2005, p. 76). The network perception is a key element that allows referring to friendship in terms of reflexiveness that is expressed clearly during the interview only, while being substantially unconscious in the daily interaction practices. Thus, even if the network has a structural effect on the single relationships, such effect is not planned *a priori* by individuals: it is unfolded with no planning, as an indirect consequence of the emotional experience that is reflexively expressed in the discourses on friendship only, both when they are done with friends and when stimulated by the researcher. The choice to combine a network perspective with a qualitative close examination, has thus been dictated, apart from a series of methodological considerations, also from the specific interests that have driven this search. From a methodological point of view, asking people to name those that they consider as friends based on a numerical limit, has the advantage of assigning to interviewed person the task to identify the edges of his/her own network. The networks surveyed in this way, have therefore a varying wideness and their variability depends on the type of relationship which the interviewed person refers to when he/she assigns that specific number (Allan, 1982; Fehr 1996)

For the purpose of this study, it was interesting to notice who were the people that each of them considered as friends. The varying wideness of the networks depends not only on the fact that an individual can have more or less friends, but most of all from the different definitions of friendship. We have chosen this type of survey to avoid excluding any type of bond that, even if existing in the network, is not activated. It can be the case of a friend whom we are not frequently in contact with, or friends belonging to one's own companionship but with whom we don't have a close relationship, but also of competitive friendships, bringing poor satisfaction. It is possible that there is a structural effect of the friendship relation on the single bonds: if the friends are mutually connected by very dense nets, it is probable that the cohesion of such structures, holds together also those dyads that would be, otherwise, disconnected. For instance, if two friends fall out but are involved in a wider and strongly cohesive network, they can continue to meet each other, thus having more chances to clear up.

The guided participation is hinged on interpersonal activities, on the importance of mutual commitment that makes practices always become collective activities. A feature of the guided participation (Rogoff, 1995), is the way in which individuals try to build knowledge. In this

case, the analysis of the participation tracks, cannot be carried out with reference to the teacher, but to the students.
The expected results show how meaningful learning (Jonassen, 2000; 2002) takes place through social and cultural dynamics (Wenger, 1998) influenced by the context in which knowledge is built; furthermore, digital storytelling, as a narrative tool that facilitates communication among students, promotes the democratic nature of computer-mediated communication (Sproull & Kiesler, 1991).
The novelty does not consist in the use of the digital instrument, but in the fact that none of the students had such a knowledge that he could possibly exceed the others. If a student responded better o before another, by changing position in the computer laboratory, the same student was confronted with a new task: summarizing and correcting a written work of another student and using power point tools. This proves that preconceptions regarding relationships and previous knowledge imply prejudices that invalidate spontaneous learning and relationships. The students who were out of sight, like Alessio, Giovanni and Adelin (5B), the latter always remaining in a peripheral position, at the end of the activities enjoyed the work that was done by using the computer, since none of them knew how to perform the task, but just the same put themselves to the test. Indeed, they told their teacher that:"it was fun!". Thus, the relationships that were randomly forced onto the students by the teacher turned out to be spontaneous. This randomness allowed a free-from-prejudice approach according to which each student helped his/her partner. In class 5C, where teaching was carried out with the use of digital storytelling, social ties were distributed as in a network, as shown in the network graphs and according to the collected data (Figure 3), since this is a class with a very high social level and sociability. After the use of the digital storytelling, graph – Figure 4 shows a greater cohesion and a higher degree of closely-knit social ties if confronted with the start, except for few nodes left at the margins. As far as the traditional lesson in class 5 B (Figures 2 and 4) is concerned, no changes in social ties was recorded. The only element that played a part in socialization may have been the time spent at school, a factor that has a great impact on personal experiences. As you can see from the network graphs in 5C, the relations between the use of digital storytelling, before and after its implementation, have changed. In Figure 3, the networks are widely spaced and uniform; however, in Figure 4 the relationships are more well-concentrated, and only a change in the position of two students can be noticed. The indices of density are the same for Figure 2 and Figure 5; however, what changes is the amount of the relations.
This may indicate two things: on the one hand, that the tool has the advantage of allowing the students to express high potential communicative and interpersonal skills; on the other hand, it marginalizes, within the group, those with low communicative and interpersonal skills (Fligstein, 2001; Jonassen, 2000; Piselli, 2001, 2003).
Several studies have been conducted to prove the importance of storytelling in teaching and learning processes; as a matter of fact, this has always been an important element in teaching. If we consider the relational aspects of teaching practice, we can say that narration and dialogue are based on the cognitive and emotional involvement of the participants to the communication process (Baldassarre, 2012; Cisotto, 2005; Kolb, 1984).

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