Hybrid solutions for didactics in higher education: An interdisciplinary workshop of 'Visual Storytelling' to develop documentation competences

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Abstract: The article reports on the results of a Design-Based Research path realized through a workshop about the "Visual Storytelling" (VS). The workshop aimed to develop teacher's professional competences about digital narrative documentation to be certified through the Open Badge system. The interdisciplinary design was developed according to the ICT-TPACK framework between the two courses "Methodologies, Didactics and Technologies for Teaching" and "Educational Research" in the Master's degree in Primary Teaching. 32 students were involved to deal with the documentation of some real educational experiences observed at school. They were asked to fill a semi-structured questionnaire at the end of the workshop. Other data came from a rubric used to evaluate VS products from three different points of views (students' self-assessment; university teachers; school teachers). The workshop stimulated the students to use technologies creatively, critically and reflectively to develop an authentic task realizing a VS product. According to the students' opinion, the workshop also facilitated collaborative processes as well as skills of self-assessment and the personalization of learning.

Keywords: Teacher training; ICT; hybrid solutions; narrative digital documentation; educational design; assessment skills; higher education.

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I. **Theoretical background**

The challenge for a quality improvement of the competence- based teaching and learning is engaging more and more Higher Education institutions into considering learner-centred models[1] in the direction of a computer-supported collaborative learning (CSCL[2]) to form knowledge-building communities.[3]

Various researches underline how changes in didactics are possible only if we think about a process dealing with the educational design and the use of technology, together with the modification of teaching beliefs.[4]

In university teaching, there are various ways of seeing/perceiving Hybrid Instruction Solutions (HS).[5] The reason for this lies in the concept of "hybrid", i.e. the mixing of different teaching approaches in the most varied of combinations when proposing learning activities aimed at achieving one or more educational goals. Even if the usually most emphasized aspect of HS is the alternation between face-to-face and distance learning activities, the concept of "hybrid solution" actually refers to different methods and teaching tools integration. In fact, HS implies a mix of various teaching approaches, either exclusively face-to-face or distance teaching, or their combination.[6]

The hybrid solutions encourage innovative educational practices and meaningful learning. These should be designed to support collaborative and

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[1] David Jonassen, Kayle Peck, and Brent Wilson, *Learning with technology: A constructivist approach* (Upper Saddle River, NJ: Merril, 1999).

[2] Antonio Calvani, Antonio Fini, and Maria Ranieri, *La Competenza Digitale nella scuola. Modelli e strumenti per valutarla e svilupparla* (Trento: Erickson, 2010).

[3] Marlene Scardamalia, John Bransford, Bob Kozma, and Edys Quellmalz. "New assessment and environments for knowledge building," in *Assessment and teaching of 21st century skills*, ed. Patrick Griffin and Esther Care (Dordrecht: Springer, 2012); Jo Tondeur, Pareja Roblin, Johan van Braak, Joke Voogt, and Sarah Prestridge, "Preparing beginning teachers for technology integration in education: Ready for take off?," *Technology, Pedagogy and Education* 26, no. 2 (2016).

[4] David Kember, "Promoting Student-Centred Forms of Learning across an Entire University," *Higher Education: The International Journal of Higher Education and Educational Planning* 58, no. 1 (2009); Khaterine Samuelowicz and John Baine, "Revisiting academics' beliefs about teaching and learning," *Higher Education* 41, no. 3 (2001); Guglielmo Trentin, "Orientating Pedagogy Towards Hybrid Learning Space," in *Progress in Education*, ed. Roberta Nata (Hauppauge N.Y.: Nova Science Publishers Inc., 2015); Guglielmo Trentin, "A Multidimensional Approach to e-Learning Sustainability," *Educational Technology* 47, no. 5 (2007).

[5] Guglielmo Trentin, "Orientating Pedagogy Towards Hybrid Learning Space," in *Progress in Education*, ed. Roberta Nata (Hauppauge N.Y.: Nova Science Publishers Inc., 2015).

[6] Guglielmo Trentin, "Orientating Pedagogy Towards Hybrid Learning Space," in *Progress in Education*, ed. Roberta Nata (Hauppauge N.Y.: Nova Science Publishers Inc., 2015).

learner-centred instruction. Hybrid solutions consider a complete form of assessment, usually the assessment for learning.[7] Three main design principles should be employed in an HS workshop: (a) engage the learners in active and collaborative instruction, (b) involve the learners in assessment processes, and (c) reuse students' artefacts as a resource for further learning.[8]

To prepare students for teaching soft skills need to be developed: creativity and innovation, communication, collaboration, critical thinking, problem-solving, local and global citizenship, and digital literacy.[9] Educational design should consider the advancement of digital literacy to make students active knowledge producers through the responsible, effective and proficient use of ICT for personal, social and cultural development.

Together with the development of digital literacy,[10] the introduction of ICT into didactics asks the teacher to use the integration between the disciplinary (content), methodological and technological knowledge. This concept is stressed in the researches about TPCK (Technological Pedagogical Content Knowledge).[11]

ICT-TPCK, a theoretical framework proposed by Angeli and Valanides,[12] is the background of the research.

Also in Higher Education this framework requires the development of some specific design skills from the teacher: 1) to identify the content

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[7] Guglielmo Trentin, "Orientating Pedagogy Towards Hybrid Learning Space," in *Progress in Education*, ed. Roberta Nata (Hauppauge N.Y.: Nova Science Publishers Inc., 2015).

[8] Guglielmo Trentin, "Orientating Pedagogy Towards Hybrid Learning Space," in *Progress in Education*, ed. Nata Roberta (Hauppauge N.Y.: Nova Science Publishers Inc., 2015).

[9] Marina De Rossi, "Questioni metodologiche, soft skill e integrazione delle ICT/ Methodological demands, soft skill and ICT integration," *Formazione & Insegnamento. Rivista internazionale di Scienze dell'Educazione e della Formazione* 15, no. 1 (2017); Maria Ranieri and Isabella Bruni, "e-MEL. Un laboratorio blended per lo sviluppo delle competenze digitali e mediali dei futuri insegnanti," *MEDIA EDUCATION* 8, no.1 (2017).

[10] Ala-Mutka, *Mapping digital competence: towards a conceptual understanding* (Luxembourg: Publications Office of the European Union, 2011).

[11] Punja Mishra and Matthaew Koehler, "Technological pedagogical content knowledge: a framework for integrating technology in teacher knowledge," *Teachers college record* 108, no. 6 (2006); Charoula Angeli and Nicos Valanides, "Preservice elementary teachers as information and communication technology designers: An instructional system design model based on an expanded view of pedagogical content knowledge," *Journal of Computer Assisted Learning*, no. 21 (2005); Charoula Angeli and Nicos Valanides, "Epistemological and methodological issues for the conceptualization, development and assessment of ICT_TPCK: Advances in Technological Pedagogical Content Knowledge," *Computers & Education* 52, no. 1 (2009); Laura Messina and Marina De Rossi, *Tecnologie, formazione e didattica* (Roma: Carocci, 2015).

[12] Charoula Angeli and Nicos Valanides, "Technology mapping: An approach for developing technological pedagogical content knowledge," *Journal of Educational Computing Research* 48, no. 2 (2013).

domains to be taught by ICT; 2) to identify the appropriate representations to transform the content domains in educational effective formats which are difficult to support by traditional media; 3) to identify teaching methods, difficult or impossible to carry out with other media; 4) to select technologies with affordance suitable for points 2 and 3; 5) to link digital activities with opportune learner-centred strategies.

Moving from the ICT-TPCK,[13] a tool of educational design for ICT integration was used to design the workshop.[14] This tool includes the seven classic elements (context, aims, time, content, skills, methodology, and evaluation) and other new four elements:

1) ICT.

2) Learning activity types[15] made available by the learning environment (Moodle).

3) Personal devices (Smartphone or Tablet) as expressions of knowledge.

4) New knowledge representations within a software platform (see the concept of multiliteracies[16]).

The integration of ICT in teaching can be useful to stimulate students to produce digital artefacts conceived as authentic tasks: for example through Digital Storytelling or Visual Storytelling (VS).[17] Using VS (Visual Storytelling) is a powerful instructional technique providing an exceptional learning experience for students. As confirmed by the literature about artifacts of digital narration,[18] we characterize these design differences, together with interactivity and messaging, in terms of the balance between

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[13] Charoula Angeli and Nicos Valanides, "Technology mapping: An approach for developing technological pedagogical content knowledge," *Journal of Educational Computing Research* 48, no. 2 (2013).

[14] Messina and De Rossi, "Tecnologie, formazione e didattica"; Laura Messina, Marina De Rossi, Sara Tabone, and Pietro Tonegato, "Formare i futuri insegnanti a progettare la didattica integrando le tecnologie," in *Teach Different!*, ed. Marina Rui, Laura Messina, and Tommaso Minerva (Genova: Genova University Press, 2016).

[15] Judy Harris and Mark Hofer, "Technological pedagogical content knowledge (TPACK) in action: A descriptive study of secondary teachers' curriculum-based, technology-related instructional planning," *Journal of Research on Technology in Education* 43, no. 3 (2011).

[16] Bill Cope and Mary Kalantzis (eds.), *Multiliteracies: Literacy learning and the design of social futures* (London: Routledge, 2000).

[17] Ellen Maddin, "Using TPCK with Digital Storytelling to Investigate Contemporary Issues in Educational Technology," *Journal of Instructional Pedagogies* 7 (2012).

[18] Edward Segel and Jeffrey Heer, "Narrative Visualization: Telling Stories with Data," *IEEE Transactions on Visualization and Computer Graphics* 16, no. 6 (2010).

the narrative flow intended by the author (imposed by graphical elements and the interface) and the story discovery on the part of the reader (often through interactive exploration).[19] When digital stories are shared on the Web, students have the opportunity to view the work of others. They learn cultural differences, gain experience with the process of peer review to expand their own knowledge. McLellan[20] confirmed that digital storytelling, which also includes VS, helps students explore the meaning of their own experience, give value to it, and communicate the experience on multiple levels to others.

Recently, many interesting studies on this topic were developed in relation with to different educational contexts (formal, non-formal and informal). They pointed out the value of digital narration, especially for the young generations.[21] Digital narration has proven to be an innovative topic also in the teachers' training and in the school world.[22]

Using stories to develop literacy is one of the oldest styles of education, but VS allows the development of the different types of literacy needed in the 21st century: information, visual, technology, and media. Robin[23] indicated that students who create digital stories improve several different technological skills aligned with the development of Digital Literacy.

Therefore, teachers should learn effective ways to motivate their students to become engaged in learning new content with the help of multimedia technologies.[24]

VS entails the use of digital media in the creation of media-rich stories to be told, shared and preserved.[25] The result is usually a brief story created with

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[19] Grete Jamissen, Pip Hardy, Yngve Nordkvelle, and Heather Pleasants, eds., *Digital Storytelling in Higher Education. International Perspectives* (New York: Springer, 2017).

[20] Hilary McLellan, "Digital storytelling in higher education," *Journal of Computing in Higher Education* 19, no. 15 (2006).

[21] Maria Ranieri and Isabella Bruni, "Mobile storytelling and informal education in a suburban area: a qualitative study on the potential of digital narratives for young second generation immigrants," *Learning, Media and Technology* 38 (2013).

[22] Maria Ranieri and Isabella Bruni, "Digital and media literacy in Teacher Education: Preparing undergraduate teachers through an academic program on digital storytelling," in *Handbook of Research on Media Literacy in Higher Education Environments*, ed. Jayne Cubbage (Hershey, PA: IGI Global, 2018); Maria Ranieri and Isabella Bruni, "e-MEL. Un laboratorio blended per lo sviluppo delle competenze digitali e mediali dei futuri insegnanti," *MEDIA EDUCATION* 8, no.1 (2017).

[23] Bernard Robin, "Digital storytelling: A powerful technology tool for the 21st century classroom," *The College of Education and Human Ecology, The Ohio State University* 47, no. 3 (2008).

[24] Halah Ahmed Alismail, "Integrate Digital Storytelling in Education," *Journal of Education and Practice*, 6, no. 9 (2015).

[25] Joe Lambert, *Digital storytelling cookbook* (Berkeley: Digital Diner Press, Berkeley, 2007).

digital tools, based upon some fundamental elements: a focused narration through the visual and presentation of emotional and involving contents. In particular, it's a matter of using images, drawings, graphics, animations or videos for the documentation or videos that are intended to create an imaginary and to narrate a story in which people can immerse themselves. VS takes full advantage of the images' to engage the public at a deep level, guaranteeing an immersive experience constituted by identification and empathy. The potential of digital narrations offered by VS is therefore suitable for the development of processes of educational documentation.[26] In fact, the potential of the visual, rather than just written or oral text, facilitates for the users the comprehension of the context and of the educational actions.

Today, the idea of documentation as narration includes new thoughts derived from theoretical research and technological development. Several researches identified the drive towards digital skills and the multiplicity of communication channels as two fundamental aspects of the new way to organise and transfer knowledge.[27] Students have their own individual approach based on their interactions and experiences and generate narrative outputs by using different sources in their creation of the digital story. These findings are in line with those reported by other researchers who observed that digital narrations support constructivist learning and concluded that in general digital narrations are a good method of teaching with positive impacts.[28]

This perspective seems to be in line with the development of some skills wished for in the 21st century: critical thinking, creativity, communication, reflection and metacognition.[29] In the creation of digital narrations, these skills can be developed through different processes. First of all decision making can be stimulated by the design of the documentation-storyboard and by the action of observation and the collection of information. Then it's important to consider the creativity in the creation of documentation and in

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[26] Alaa Sadik, "Digital storytelling: a meaningful technology-integrated approach for engaged student learning," *Education Tech Research Dev* 56, n. 4 (2008).

[27] Roberto Raieli and Perla Innocenti, *Multimedia informational retrieval: metodologia ed esperienze internazionali di content-based retrieval per l'informazione e la documentazione* (Roma: AIDA, 2004); Marina De Rossi and Graziella Gentilini, *How to produce documentation to relate teaching and training experiences* (Padova: Cleup, 2007).

[28] Pi-Sui Hsu, "Examining changes of preservice teachers' beliefs about technology integration during student teaching," *Journal of Technology and Teacher Education* 21, n. 1 (2013).

[29] John Hattie, *Visible learning for teachers: Maximizing impact on learning* (New York, NY, US: Routledge/Taylor & Francis Group, 2012); Michael Fullan and Maria Langworthy (eds.), *How New Pedagogies Find Deep Learning* (London: Pearson, 2014).

the way of communicating it, and finally, reflection and metacognition in the debriefing phase on the documentation have to be considered.[30]

In this sense, digital narrative documentation is a creative and flexible tool for the search for languages and communication models. These models can be useful for the development of a narration potential that can improve its own effectiveness.[31] The most recent studies attribute great importance to the narrative methodologies used as a means to the development of learning. When narrative methodology becomes a documentation tool, it allows the empowerment of subjects and communities.[32]

From a documentation point of view, it is necessary to record complex activities and share best practices.[33] The power lays in connecting two different worlds: the one of narration, reflexivity, interpretation, and assessment on one side, and the world of new media and innovative technological tools on the other.[34]

Educational documentation collected using digital narration approach makes it possible to define several elements of the didactic action:[35]

- The nature of learning processes and the cognitive/emotional strategies adopted by each child and by the group.

- Professionals' actions in educational-didactic experiences.

- Choice and use of methods, techniques, and tools in everyday practices.

- Social and cultural dimension of the educational actions carried out.

- Strategic choices and the purposes of action.

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[30] Margot Boardman, "'I know how much this child has learned. I have proof!' Employing digital technologies for documentation processes in kindergarten," *Australian Journal of Early Childhood* 32, n. 3 (2007).

[31] Hilary Seits, "The Power of Documentation in the Early Childhood Classroom," *Young Children*, March (2008).

[32] Janice McDrury and Maxine Alterio, *Learning through Storytelling in Higher Education* (London: Kogan Page, 2003).

[33] De Rossi and Gentilini, "How to produce documentation to relate teaching and training experience".

[34] Marina De Rossi and Corrado Petrucco, *Le narrazioni digitali per l'educazione e la formazione* (Roma: Carocci, 2013).

[35] Marina De Rossi and Emilia Restiglian, *Narrazione e documentazione educativa. Percorsi per la prima infanzia* (Roma: Carocci, 2013).

II. **Design and Methodology**

During the planning of the research design, the "crucial crux" we have to deal with is the educational design[36] because it's the *ground* where we can operationalize technological knowledge in the sense that it allows to "act" that knowledge.[37]

The general idea of our research, already tested in an exploratory study in another Master's degree,[38] is to transfer some ideas for the teaching of ICT skills into university syllabuses for teacher education. This, to renew the teaching of digital skills and promote the confident use of ICT for future teachers.

The research questions of this study were: Can the creation of a VS develop professional competences for narrative digital documentation? Is an interdisciplinary and ICT-enhanced design workshop able to develop cross-sectional competences?

The research involved pre-primary and primary pre-service teachers in an integrated educational design approach.[39] They were thirty-two 2nd year students (28 Female and 4 Males, 15% sporadic experiences at school), a convenience sample as they voluntarily decided to participate in the workshop.

Participants were involved in a 24 hours blended workshop (observation of educational activities at school; work in university classrooms; online work) during the Academic Year 2017-18. The intervention in the university classrooms considered active learning lessons, work in the Moodle platform and use of the Mobile Storytelling Tool.

Students agreed to participate in the research and they authorized the researchers and to the use and process of data for the purpose of the present study. In our research, we used two tools: a semi-structured questionnaire (16 close-ended questions and two open questions) and a rubric.

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[36] Jorma Enkenberg, "Instructional design and emerging teaching models in higher education," *Computers in Human Behavior*, 17, no. 5-6 (2001); Diana Laurillard, *Teaching as a design science* (London: Routledge, 2012).

[37] Judy Harris and Mark Hofer, "Technological pedagogical content knowledge (TPACK) in action: A descriptive study of secondary teachers' curriculum-based, technology-related instructional planning," *Journal of Research on Technology in Education*, 43, no. 3 (2011).

[38] Marina De Rossi and Emilia Restiglian, "The experience of ICT integration in Higher Education: Digital Storytelling for educational documentation," in *9th annual International Conference of Education, Research and Innovation – Conference Proceedings*, ed. Luis Gómez Chova et al. (Valencia: IATED Academy, 2016).

[39] Charoula Angeli and Nicos Valanides, "Technology mapping: An approach for developing technological pedagogical content knowledge," *Journal of Educational Computing Research*, 48, no. 2 (2013); Messina and De Rossi, "Tecnologie, formazione e didattica."

The self-assessment online exit questionnaire was anonymous and all the VS products were closed to people external to the study. The aim was to investigate students' opinions and it was administrated at the end of the workshop.

The questionnaire comes from a process of adaptation of other tools and theoretical models provided in literature[40] and it consists of two kinds of questions:

a) Quantitative questions on some specific aspects of the workshop in the perspective of educational design according to the ICT-TPCK model.

This part is composed of 16 close-ended questions arranged in four dimensions:

1) Integration processes of ICT into didactics (4 items: The use of the Moodle platform helps the work with mates; The use of the Moodle platform allows a personalization of the timework during the workshop; The use of ICT in the documentation helps your knowledge representations; The use of ICT in the documentation improves the processes of assessment).

2) Workshop activities (4 items: The activities are appropriate for your learning needs; There is coherence between the educational aims, methodologies, and technologies proposed; The activities help the reflective processes in your work; The steps/the process to build the VS are taken into account for the final assessment of the workshop).

3) Competences about didactics and evaluation (4 items: I improved my skills about the definition of the educational aims by building the storyboard for documentation; I improved my skills about the definition of educational assessment by reflecting on documentation; I improved my skills about observation during the activities proposed at school; The use of the video developed the re-representation of the observed processes).

4) VS (4 items: I think that the VS is an effective tool of documentation; The educational material given as support was useful; The use of your personal device with the Mobile Storytelling Tool facilitate the documentation work; The documentation with VS allows a more effective communication to external people, e.g. community, families).

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[40] Herbert Marsh and Michael Bailey, "Multidimensionality of students' evaluations of teaching effectiveness: A profile analysis," *Journal of Higher Education* 64, no. 1 (1993); Herbert Marsh and Michael Dunkin, "Students' evaluations of university teaching: A multidimensional perspective," in *Higher education: Handbook on theory and research*, ed. John Smart (New York: Agathon Press, 1992).

b) Qualitative questions in order to formulate some general and overall comments about the whole experience.

In each quantitative dimension, a set of statements is proposed and participants are asked to state their agreement on a 4- point Likert scale. This solution was chosen to eliminate the neutral position common in 5- and 7- point Likert scales, being still accepted in literature[41]. To determine the scale's reliability and internal consistency, the Cronbach's alpha was calculated (0.865) and proved the reliability of the tool. (Fig. 1)

Fig. 1
Cronbach's Alpha

Item-Total Statistics			
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1a	41,50	29,032	0,416	0,861
1b	41,31	27,899	0,743	0,850
1c	42,44	28,770	0,368	0,863
1d	42,19	27,641	0,423	0,862
2a	42,09	27,378	0,612	0,852
2b	42,50	28,000	0,617	0,853
2c	42,53	29,612	0,304	0,865
2d	42,00	28,387	0,541	0,856
3a	42,50	26,839	0,525	0,856
3b	42,63	28,629	0,430	0,860
3c	42,19	28,157	0,603	0,854
3d	42,72	27,112	0,540	0,855
4a	42,31	28,609	0,247	0,875
4b	42,50	27,677	0,598	0,853
4c	42,69	26,609	0,661	0,849
4d	41,84	27,233	0,621	0,851

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[41] Domenica Fioredistella Iezzi, *Statistica per le scienze sociali* (Roma: Carocci, 2009); Piergiorgio Corbetta, *La ricerca sociale. Metodologie e tecniche. II Le tecniche quantitative* (Bologna: Il Mulino, 2003).

The other tool was the rubric (4 levels) used to evaluate some elements of VS products built to document activities the students observed at school.[42] The same rubric was used by students to self-assess their work, by university teachers to evaluate the product as part of the exam and by school teachers to have an external and expert point of view. In this sense, it was possible to speak of a *true documentation skill* which involves ICT and assessment.[43]

III. **The Intervention**

The intervention consisted of the realization of an integrated workshop, seen as an additional activity to two courses within the Bachelor's degree in Primary Education for future pre-primary and primary teachers. The "Methodologies, Didactics and Technologies for Teaching" and "Educational Research" courses were held in the same semester for a duration of 42 hours each. Respective teachers designed a multidisciplinary workshop in a blended modality for a duration of 24h. These were in line with each course's educational aims and the students' assessment in these would be part of their final evaluation along with the courses' exams. The steps of the workshops will be presented below.

Step 1

a) Theoretical preparation on digital narrative documentation at school (with university teachers).

b) Six hours of observation at school (internship) to observe and to gather material useful to the documentation (with school teachers).

Step 2

a) Familiarization activities with tools and technologies for documentation in a specific area in the Moodle platform.

b) Exploration of the Mobile Storytelling Tool.

c) Reflection learning in small groups by using the forum to design the storyboard to build the VS.

d) Analysis of some video tutorials about VS creation.

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[42] Najat Smeda, Eva Dakich and Nalin Sharda, "The effectiveness of digital storytelling in the classrooms: a comprehensive study," *Smart Learning Environments* 1, n. 6 (2014).

[43] De Rossi and Restiglian, "Narrazione e documentazione educativa. Percorsi per la prima infanzia".

e) Individual VS creation on a significant activity observed during the internship activity at school (wiki for the writing of the storyboard; other open resources for the realization of the "digital artefact"-Mobile Storytelling Tool).

f) Peer debriefing at the end of the VS creation.

g) Fill in of a questionnaire for self-assessment.[44]

The workshop was conceived as a sort of mental space even before being a physical one: a space in which the student can be, think, create, try, share and choose things.[45]

The creation of the storyboard (step 2-c) always considers six semantic areas crucial to any educational documentation:[46]

1) *Project area* (analysis of needs, feasibility, goals). This is the project synthetic description area that outlines the experience to be documented.

2) *Methodological area* (techniques, strategies, management). This is the methodology, work tools, strategies and experience management description area. The theoretical inputs and choice justification are important at this point.

3) *Communication area* (target for the documentation, foreseen use, communication supports, tools). This is the area in which the documentation is communicated internally and externally.

4) *Contextual area* (spaces, schedules, organisation, resources, and target). This is the area of the description (visualisation) of the context and the environment in which the experience is taking place. It includes theoretical recall of choice justification.

5) *Experience area* (activities, contents). This is the area for the description of the educational activities (steps; relation child/adult and child/child; class climate).

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[44] Marina De Rossi and Emilia Restiglian, "To be a competent documentalist. The experience of preservice educators of early childhood with the digital storytelling," in *Educating for the future*, ed. Eystein Arntzen (Brussels: ATEE aisbl, 2014).

[45] Emilia Restiglian, *Progettare al nido. Teorie e pratiche educative* (Roma: Carocci, 2012).

[46] De Rossi and Restiglian, "Narrazione e documentazione educativa. Percorsi per la prima infanzia"; De Rossi and Restiglian, "To be a competent documentalist. The experience of preservice educators of early childhood with the digital storytelling," In *Educating for the future*, ed. Eystein Arntzen (Brussels: ATEE aisbl, 2014).

6) *Observation and assessment area* (tools). This is the area in which the observation methods and tools are described. It includes an explanation of the assessment process/result indexes.

7) *Professional reflective autobiography area* (reflection on the experience, self-assessment, re-planning). This is the area where the teacher's (or the team of teachers') point of view is described. Strengths and weaknesses, criticalities and resource streamlining are highlighted here. The self-assessment concerns the choices made, the results obtained, and one's own role in the whole process. In this case students observed and they gather the class teachers' reflection through a brief final conversation.

Going through all seven semantic areas makes it possible to collect a complete documentation. It is essential to define the used methodologies, as well as space and time context, the recipients of the documentation (internal and external users; colleagues; educational professionals; families; municipalities; financing bodies; management bodies;...). These require different levels of observation and assessment tools, e.g. being much more specific when documenting to the colleagues' advantage.

IV. **The questionnaire results**

The survey involved the total population, as the filling of the questionnaire was a compulsory step required when attending the workshop. This allowed a 100% response rate.

Below, the reader can find some results of the univariate analysis (Fig. 2). In this way a general picture of the students' opinions at the end of the workshop can be described. The study is descriptive and in the present discussion we will mainly deal with the description of some analyses, compared: the distribution by the mode (Mo), the Median (Me) and percentages for each of the 18 items.

The highest values are related to the first (1) dimension, especially in the personalization of the student's work times (Mo=4). The Moodle platform is very well known by the students who use it as support of frontal lessons. Furthermore, the platform allows them to access materials whenever they want and need, according to their needs and to their motivation. Also, the work with peers is improved (Mo=4) because the platform offers many occasions to interact with other students, e.g. with the forum or the blog.

Figure 2
Answers to the questionnaire

Statistics		N Valid	Mean	Median	Mode	Dev. st.	Variance
The use of the Moodle platform helps the work with mates	1a	32	3,56	4,00	4	0,504	0,254
The use of the Moodle platform allows a personalization of the timework during the workshop	1b	32	3,75	4,00	4	0,440	0,194
The use of ICT in the documentation helps your knowledge representations	1c	32	2,63	3,00	3	0,609	0,371
The use of ICT in the documentation improves the processes of assessment	1d	32	2,88	3,00	3	0,751	0,565
The activities are appropriate for your learning needs	2a	32	2,97	3,00	3	0,595	0,354
There is coherence between the educational aims, methodologies and technologies proposed	2b	32	2,56	3,00	3	0,504	0,254
The activities help the reflective processes in your work	2c	32	2,53	3,00	3	0,507	0,257
The steps/the process to build the VS are taken into account for the final assessment of the workshop	2d	32	3,06	3,00	3	0,504	0,254

Statistics		N Valid	Mean	Median	Mode	Dev. st.	Variance
I improved my skills about the definition of the educational aims by building the storyboard for documentation	3a	32	2,56	3,00	3	0,759	0,577
I improved my skills about the definition of educational assessment by reflecting on documentation	3b	32	2,44	2,00	2	0,564	0,319
I improved my skills about observation during the activities proposed at school	3c	32	2,88	3,00	3	0,492	0,242
The use of the video developed the re-representation of the observed processes	3d	32	2,34	2,00	3	0,701	0,491
I think that the VS is an effective tool of documentation	4a	32	2,75	3,00	3	0,842	0,710
The educational material given as support was useful	4b	32	2,56	3,00	3	0,564	0,319
The use of your personal device with the Mobile Storytelling Tool facilitate the documentation work	4c	32	2,38	2,00	3	0,660	0,435
The documentation with VS allows a more effective communication to external people (e.g. community, families)	4d	32	3,22	3,00	3	0,608	0,370

Regarding the second (2) dimension (the workshop activities) the four items had the same mode (Mo=3). The analysis of this dimension was useful in particular for the item 1d which addresses the assessment in the university didactics. Students generally appreciated that the efforts done during the workshop would have been considered for the final exam.

In the third (3) dimension students could give their opinions about what competences they achieved about didactics and evaluation. The ones about observation (3c; 3d) like the one about the building of the storyboard are the competences students think to had achieved most (Mo=3).

The last (4) dimension focused on the perception of the students on the VS and the mode was 3 for all the four items. It is a good result because it is very important for the teachers, and the schools, to *make the learning visible*, to make people understand what they propose, how they work, how pupils learn. Students deem VS is an effective tool of documentation and think that the use of the platform supports the exchange of the documented experiences.

The median for the majority of the items is on value Me=3 with the exception of items 1a and 1b where it reaches the value Me=4 with reference to the integration of ICT. Here, the use of the platform to implement a hybrid teaching modality seems to encourage opportunities for group collaboration and time customization. The median of Me=2 in items 3d and 4c concerning the use of the video to report on the observed processes and the Mobile Storytelling Tool to facilitate the documentation work. This last data could derive from the students' inexperience, as it was their first time with this kind of teaching and learning experience.

Additional information comes from the analysis of the answers' percentages (Fig. 3).

With reference to the percentages of the questionnaires, we will report here only the most interesting data.

In dimension 1, all respondents gather around "agree" and "strongly agree" in considering the platform as a facilitator for group work (item 1a). 75% of the students strongly agree that the use of the platform helped the personalization of the work times during the workshop (item 1b).

In the second dimension about the workshop activities, 66% of the students felt that these were appropriate for their learning. Another interesting fact is that 86% of the students agreed and strongly agreed with the statement that the proposed activities developed reflective processes.

In general, the third dimension was the most difficult to understand for the participants because it required a metacognitive process that was too high for second year students. Consequently, there were also percentages of low agreement in the items. However, for the purpose of the research, it is

interesting to note that 75% of the students agree with the statement of item 3c concerning the observation skills implemented in a real situation (at school).

The fourth dimension required a critical assessment of the use of the tool (VS), which was not assumed to be simple to implement for documentation purposes. 59% of the students agreed on the usefulness of the material given to support the VS making in the workshop. Moreover, more than half of the respondents understood the actual usefulness of the documentation with VS for the communication that the school should have with families, territory and community.

Figure 3

Percentages of Questionnaire's Results

1a				1b				1c				1d			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
0	0	14	18	0	0	8	24		14	16	2	0	11	14	7
0%	0%	44%	56%	0%	0%	25%	75%	0%	44%	50%	6%	0%	34%	44%	22%
2a				2b				2c				2d			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
0	6	21	5	0	14	18	0	0	15	17	0	0	3	24	5
0%	19%	66%	16%	0%	44%	56%	0%	0%	47%	53%	0%	0%	9%	75%	16%
3a				3b				3c				3d			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2	13	14	3	1	16	15	0	0	6	24	2	4	13	15	0
6%	41%	44%	9%	3%	50%	47%	0%	0%	19%	75%	6%	13%	41%	47%	0%
4a				4b				4c				4d			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2	10	14	6	1	12	19	0	3	14	15	0	0	3	19	10
6%	31%	44%	19%	3%	38%	59%	0%	9%	44%	47%	0%	0%	9%	59%	31%

Regarding the qualitative aspects, in the questionnaire the following questions were proposed:

1) What aspects of ICT integration do you consider the most important?

2) What methodological and assessment aspects do you think should be improved?

These questions allowed us to deduce some insights and keywords about strengths and weakness of activities.[47] The answers were analyzed with content analysis, finding categories in the ex-post phase. Open questions were important for the students to freely express themselves after the workshop. It was a useful feedback to highlight some concrete aspects of ICT integration, including suggestions and proposals to improve the overall quality of the interdisciplinary workshop (Fig. 4).

Figure 4

Content analysis of the open questions

N.1 Integration of technologies into didactics	N.2 Methodological and assessment aspects that I would change
To promote learning (7) To increase the group participation (8) To increase motivation (10) To foster the realization of a professional task as a teacher (12) To promote collaborative learning (13) To help a better development of what have been learned in the course (18) The video technology helped to make the educational documentation more effective (20)	The methodology of VS could be used also in other educational contexts, different from the documentation (17) The weighted assessment should be more important for the final evaluation because the work was hard to carry on (21)

Many students considered video technology a very good help to make the educational documentation more effective (20 students) and appreciated the possibility to deepen the contents of the course (18). Using Moodle platform they could cooperate (13) and with the workshop they could perceive themselves as teachers (12). The increase of the group participation and the promotion of learning also emerged (8 and 7 students). It is interesting to note that 17 students suggested the dissemination of the workshop on documentation also in other educational contexts. What they asked for most

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[47] Arjuna Tuzzi, *L'analisi del contenuto. Introduzione ai metodi e alle tecniche di ricerca* (Roma : Carocci, 2003).

is the weighted assessment: 21 students declared that the activity of the workshop should have greater value in the weighted mean of the grade exam.

V. **Realization of the VS and three-way product evaluation**

VS as a product was assessed with a rubric to the three groups of subjects involved in the research. It was assessed according to the seven semantic areas of the documentation we mentioned before. To evaluate VS products we used a four level rubric (1 = very inadequate; 2 = inadequate; 3 = adequate; 4 = very adequate). (Fig. 5)

Figure 5

Rubric of VS

| Level	1-Inadequate	2-Not completely adequate	3-Adequate	4-Very adequate
Project	The project's topic is not explained	Ideas/Aims/ Stages are missing	There are all the design elements	The design elements are complete, concise, effective
Methodology	Methods, strategies and tools are not highlighted	Methods, strategies and tools are just mentioned	Methods, strategies and tools are clear	Methods, strategies and tools are explained and supported by theoretical references
Communication	Not adequate to the target Lack of narrative coherence Mistakes about digital production (times, images, music, rhythm)	Coherent Some little mistakes about production	Adequate Coherent	Adequate Coherent Effective Engaging

Level	1-Inadequate	2-Not completely adequate	3-Adequate	4-Very adequate
Context	The context of the educational experience is not underlined	The context of the educational experience is just outlined	The context of the educational experience is described in its basic elements	The context is related with the educational experience
Experience	There is a lack of description	The description doesn't underline all the steps of the experience	The description is complete	The description is complete and underlines the meaning of the educational experience
Observation/ evaluation	There is a lack of description about tools of observation and assessment	The description about tools of observation and assessment is not completely made explicit	The description about tools of observation and assessment is complete	The description about tools of observation and assessment is complete and reflective
Reflection/ debriefing	Not present	Superficial	Descriptive	Complete and accurate

The rubric was used to evaluate the documentation process realized with VS by:

a) Students (self-assessment of their VS artefact).

b) University teachers.

c) School teachers (at the institutions where the educational experience reported in VS took place).

A graph of the mode (Mo) of the overall assessments by the three subject groups is reported below. The graph shows all the areas considered in the production of the VS documentation. (Fig.6)

Fig. 6
Assessment of the VS (Mo)
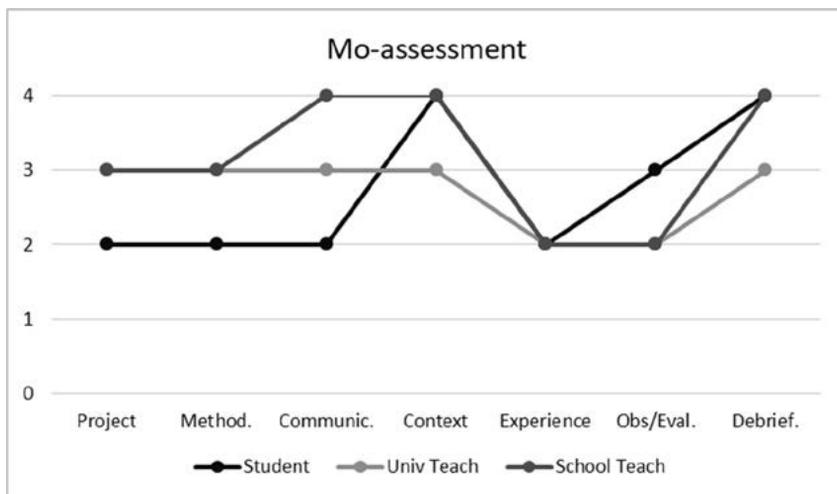
From the assessment's analysis of each documental area, it can be noted that the positioning of the mode is different in most cases.

Only in the documentation area on the educational experience observed at school, all the three groups are positioned on level 2 (not completely adequacy). This area clearly showed a lack of information about the elements essential to understanding what really happened at school. Instead, the documentation of the educational context observed (space, materials, pupils' disposition, tools…) has been assessed by students and school teachers with a high level (Mo=4) and by university teachers with a good level (M=3).

Students assessed their VS product more critically (Mo=2) in the areas of the project documentation, from which they would have inferred the educational experience, the methodology used and overall communication's aspects in the class.

The assessments of the area about the use of observation and evaluation tools employed at school are positioned on the same level (Mo=2) both for university teachers and for school teachers. It seems that this area has a high grade of complexity for students in their second year of Higher Education, being them just at the beginning of their internship at schools, as organized in the initial teacher education course which lasts five years.

In general, students of the 2nd year tend to tell the experience (e.g. the internship expected in their course degree) as if it was a chronicle ("I did", "I

saw" ...), making it difficult to grasp the complex sense of the educational actions observed at school. They also tend not to use an appropriate and specific language in their descriptions.

The reason behind this could be the complexity of decoding educational actions. In fact, decoding requires critical thinking and active metacognition. It was important to use the area of debriefing during the VS realization to work on this process because it stimulated the students to observe and document, paying attention to the reflection in action. The assessments of the three groups of subjects positioned on good levels (Mo=3 for university teachers and Mo=4 for students and school teachers).

The multimedia production of the VS workshop seems to have promoted the critical evidence. This aspect is reflective and projective and it's useful for the development of teacher professional skills.

VI. **Discussion**

We try here to develop the discussion starting from the research questions. The first was about the possibility to create a VS to develop professional competences for narrative digital documentation. The second concerned the possibility to develop cross-sectional competences through an interdisciplinary and ICT-enhanced workshop design.

To answers to the questions, our work has been based on the learning of documentation skills, meaning the capacity of building digital narrative documentation. Among the various definitions of competence, we chose the one meaning "the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development.[48] The competence about documentation allows school teachers to communicate their work to the family and to the community. The teacher's competence about documentation also facilitates the creation of professional learning communities and allows processes of monitoring and self-assessment of their own work.

What we experimented in the workshop, even with the limitations we will explain in the conclusions, reveals quite interesting elements settled in the literature already cited, about:

- The efficacy of the ICT integration into didactics to stimulate students to produce authentic tasks.

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[48] Recommendations 2008/C 111/01.

- The possibility for the students to explore the meaning of their own experience, giving value to it, and communicating it to others on multiple levels.

In order to assess competence, therefore, it is not possible to refer only to the possession of knowledge, basic skills and attitudes, it is also necessary that such qualities are used in contexts that require a performance.[49] This performance can coincide with an authentic task as the VS we proposed in the workshop.

A true task should motivate students and help them learn how to manage concrete, real-life situations using their knowledge and skills to develop something new. The choice of a task that would involve multiple learning dimensions for the student was not meant to cause problems for the students, but, rather, to help them apply what they had learned.

A true task puts the student inside a real-life situation, in our case the world of the school. The documentation has several functions, for instance, to evaluate the proposed educational activities.

Again with regard to the assessment, we worked within a theoretical framework[50] that takes into account several points of view: the *objectivity* of the university teacher who evaluates the product, the *subjectivity* of the producer of the digital construct (the student, as a form of self-assessment) and the *intersubjectivity* of the school teacher.

In this way, we tried to join the traditional role of the teacher as an evaluator with that of an active student able to carry out a metacognition process concerning his/her own work.

VII. **Conclusions**

The present research shows some limitations in the fact that it had to be adapted to the curricular context of the Primary Teaching Course Degree, which did not widely include a HS design option nor an inter-disciplinary point of view. This led to a reduced sample choice (convenience sampling), considering also that students were free to participate or not. In addition, the group was perhaps still inexperienced as only on their second year of pre-service education. The research design included only the rubric as a qualitative tool for the products' assessment, as part of the course's final evaluation. The survey could have been made more complete and in-depth by using, together

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[49] Guy Le Boterf, *Repenser la compétence* (Paris: Eyrolles, 2010).
[50] Michele Pellerey, *Le competenze individuali e il portfolio* (Roma: ETAS, 2004).

with the questionnaire, other tools, as the focus group, or by expanding the sample including older students. This would be interesting in particular to understand the actual training potential of ICT-TPCK design procedures for the development of skills in hybrid learning contexts. However, from the information gathered through the data analysis (questionnaire and rubric) we can discuss some interesting elements for possible future experiences in teaching courses degrees.

Our work could continue, with similar modalities, in other courses of the same course degree and in other course degrees for the training of different professional figures.

The experience is useful for pedagogic studies that aim at training competent professionals (hard skills and soft skills), but, above all, persons that are cognizant and "reflective" person, able to adapt knowledge, skills, and attitudes, according to the specific context in which they are working.

Finally, this formative path is very useful for our work as university teachers, as it provides innovative indications, especially for interdisciplinary planning, in order to make students active participants in their learning experience and producers of culture.

The introduction of a workshop in the Higher Education curriculum can represent a strong incentive for university teachers:

a) To integrate the ICT design in teaching.

b) To develop an interdisciplinary design in order to give greater coherence and unity to the curriculum.

c) To develop skills and not only knowledge.

d) To assess students by authentic tasks connected with the professional life.

In conclusion, we think the introduction of a workshop like this in the Higher Education curriculum could help supporting students in their learning processes for the development of transversal skills. The ICT use in workshop-based teaching could foster digital competences, active and collaborative learning, and enable concrete experiences of reflective learning through the peer review processes.

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Hybrid solutions for didactics in higher education: An interdisciplinary workshop of 'Visual Storytelling' to develop documentation competences

Marina De Rossi and Emilia Restiglian