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Teaching at the University:
Analysis of a Case Study Concerning First Employed Teachers

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ABSTRACT

The paper reports the results of an investigation on teaching supported by digital equipments in an Italian university. The opportunity for the study arises from the creation of a particular training activity for first employed teachers (called TFA), and it aims at analyzing the teaching styles adopted by professors when the use of digital technologies is proposed to support didactics. Two main results emerge from the collected data: first, most part of professors have a common view of the use of digital technology in teaching, based on the support that tools can give to their work; second, university professors usually have little or no consciousness of the positive influence that virtual environments can have on teaching and how e-learning can help students in autonomously building and develop their knowledge.

KEYWORDS

Digital Competence, E-Learning, Teaching, Tools for Teaching and Learning

INTRODUCTION

In this work teaching planning and carrying out, in two different situations, is discussed: first the strategies to be used in a traditional teaching activity with a reduced use of information and communication technologies (ICT/IT) is proposed, second the influence of a technology-based contexts (*pervasive computing* and *social networking*) on teachers' work is analyzed.

It should be remembered, in fact, that the discussion of teachers' competences and of the strategies to be used in teachers' work, in Italy like in the rest of the world, has been based on different theories and psycho-pedagogical paradigms. These paradigms,

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that have been developed over the time, have highly influenced didactics in formal contexts, and in what follows a summary of their features is reported.

Under the assumptions of behaviorism (the first paradigm reported here), which considers observable behavior more important than the understanding of mental activities, behavior has to focus on simple elements (stimuli and responses), and learning is the expression of a behavioral change. The principles of behavioral theory have been enriched over the time with many contributions, leading to instructionism and to the definition of mastery learning (Bloom, 1968), with the main aim of improving the quality and the level of students' performances. As a consequence, teachers' education and training had to be centered on the strategies they had to adopt for the successful communication of scientific topics and for helping the students in the learning of the discipline contents.

On another hand, cognitivism, has focused on the tools allowing data and information acquisition and their elaboration and storing. The attention for teachers' education has now been centered on the tools to be used in the classroom to help students to interact with reality and autonomously construct their way of learning.

Constuctivism, at last, has proposed two different interpretations for human learning and knowledge development: the first, based on the interactivist theory, which has given much more importance to the biological matrix of learning and to the interaction between the subject and the environment (Piaget, 1981; Ausubel, 1963), the second (social constructivism), which has given a prevailing role to social interaction in the learning process, by means of the zone of proximal development (ZPD), where learners construct their knowledge by means of the language, through socially mediated interactions (Vygotskij, 1974). Moreover, socio-cultural constructivism has suggested further interpretation for human learning by means of the contribution of the cultural situated approach in the construction of knowledge (Varisco, 2002). The influence of constructivism on teachers' education is now mostly centered on the strategies for the construction of learning environments, where the students can benefit of a situated approach to learning and can develop collaborative strategies of learning. On this side, other contributions from non-formal educational contexts must be highlighted, the most relevant among which are: the experiences on cognitive apprenticeship (Collins et al., 1987), the communities of practices (Wenger, 1998), and the legitimate peripheral participation (Lave & Wenger, 1991).

The studies described so far have led many authors to introduce the notion of "teaching styles" to create three different classes of teachers' behaviors and approaches to education; in each of them the influences of the psycho-pedagogical paradigms described above on teachers' work can clearly be found, and the result has been the definition of the following styles: top-down, bottom-up and social (Dolmans et al., 2003).

The analyses reported until now have produced a better description of the knowledge, the instruments and the processes that teachers need for their everyday work and have led to the definition of special learning environments, called rich, within which new strategies for teaching could be applied (Varisco, 2002).

It has to be remarked here that mass-media and digital technologies were already present in the rich environments described above, but their role has been secondary to traditional organization of teaching. New suggestions and impulse for teachers' work have come from the introduction of e-learning, both in its pure application and in the creation of blended experiences. By means of digital technologies, in fact, technological learning environments (TLE) and virtual learning environments (VLE) have been built, and the carrying out of new teaching experiences, very difficult to create and manage in traditional classes, has been made possible (e.g., collaborative learning, communities of learning etc.).

In these new contexts teachers' work is no more the same than in the past and new technological skills together with social-relational and affective competences are needed.

When looking at the influence of IT/ICT on teachers' work it has to be remembered here that most part of the changes proposed were strictly connected to psycho-pedagogical paradigms; on this side, the metaphors of Taylor (1980) have played a relevant role, because they have marked an evolution in the ways digital technologies intervened in modifying teachers' functions.

The first metaphor, tutor, is directly connected to the experiences of behaviorism and involves the use of specific tools to let computers and other digital equipment help the teachers (e.g. tools like CAI, CAE and CAL programs or Artificial Intelligence software like ICAI and ITS.)

The second metaphor, tool, gives to computers an active role in the application of the cognitivist paradigm in formal contexts and, more generally, in all teaching and learning processes. As an example, software of various types, especially office automation tools and authoring systems, have been used to let students develop their own way of managing information and knowledge.

The third metaphor looks to the computer as a "tutee" for the development of meta-cognitive skills, just from early childhood. It is based on the introduction of computer programming at school (Papert & Harel, 1991), by means of special graphical environments (e.g., Winlogo).

The explosion of the Internet, and the transition from static to dynamic Web, have introduced the dialogue between the user and the source of the information as well as the communication between the users themselves. As a consequence, IT/ICT have made easier the planning and execution of anchored and generative learning (Bransford et al., 1990), cognitive flexibility (Spiro & Jehng, 1990) and intentional learning (Brown & Campione, 1996).

All over the world many projects have been funded by educational institutions to improve the quality of teaching and the strategies that teachers can use in their everyday work. In Italy, the Ministry of Education has promoted and funded in the last ten years the projects innova-educazione, innova-scuola and Cl@ssi 2.0, all devoted to the development of educational activities, strongly based on the use of IT/ICT, in a contemporary and complex way and, more recently, a national project (PNSD: Digital School National Plan) has started.

In an international perspective, the Unesco (2011), always sensitive to the problems of education and to the use of digital technologies in education, has proposed a framework for the ICT competences that teachers must have to work in the knowledge society. In Table 1, the framework from UNESCO is reported.

Main aim of the investigation discussed in this work concerns the analysis of the correspondence between theory and practice in teachers' planning and carrying out in a university context, where new courses for the training of first employed teachers has to be made and the use of digital equipment and e-learning strategies can be adopted.

The Reasons for the Investigation, the Instrument Adopted and the People Involved

If the UNESCO framework for teachers' digital competences is a good starting point for the analysis of teachers' competences in digitized contexts it has to be remarked here, that former studies on the creation, development and assessment of digital competences (Calvani et al., 2008), played a relevant role in the definition of a framework for digital competence and in the creation of suitable instruments for its assessment. On this side, while looking at the possible frameworks for digital competence analysis, the classical cognitive, affective and social-relational taxonomies have been considered, together with the elements and the categories identified by Piaget in the construction of knowledge, i.e. space, time and causality (Cartelli, 2010). Otherwise stated the authors had clear in mind, when planning the survey, that the classroom is transformed by digital technology into a new educational context (i.e. a virtual environment), where time and learning cannot be confined in the physical space of the class and cannot be limited to individual study or to personal thinking. The idea of an investigation in the university context, to verify how much the same ideas were perceived by professors usually managing their teaching in a traditional way (at least in Italy and in humanistic disciplines), has been in the authors minds since a long time but couldn't be performed for different reasons. It

Table 1. Unesco ICT competency framework for teachers

	Technology Literacy	Knowledge Deepening	Knowledge Creation
Understanding ICT in education	Policy awareness	Policy understanding	Policy innovation
Curriculum and assessment	Basic knowledge	Knowledge application	Knowledge society skills
Pedagogy	Integrate technology	Complex problem solving	Self-management
ICT	Basic tools	Complex tools	Pervasive tools
Organization and administration	Standard classroom	Collaborative groups	Learning organization
Teacher professional learning	Digital literacy	Manage and guide	Teacher as model learner

was especially hard, in fact, to justify to university professors the need for a survey aiming at analyzing their knowledge and skills in teaching in a technological setting (TLE or VLE), mostly because, the assessment of their teaching took place first of all and, the discussion of the dimensions that the new learning environments made available and the opportunities for the improvement in the quality of teaching went in the background.

A great opportunity for the carrying out of the investigation the authors had in mind has come from the changes introduced by the Italian Ministry of Education in teachers' training and education for their first employment: the creation of the Active Training (*Tirocinio Formativo Attivo* - TFA).

The activation of the TFA, implemented the first time in Italian university and especially at the University of Cassino in 2013, involved different scientific sectors and many professors. Due to this experience, an intense debate on the features and the structure of the educational activities to be planned for teachers took place; it is especially true for the topics in the disciplines involved and for the pedagogical aspects of teachers' education. As a consequence, teaching work in the TFA has been split into two parts: a pedagogical module (common to all courses) and various disciplinary modules (specific for different teaching classes). In the first case (i.e., the pedagogical module), the blended learning strategy has been adopted (mixed presence-distance activities) and the e-learning platform Moodle has been used to support online activities; in the second case (disciplinary modules) only traditional lectures have been allowed, but all professors have been invited to use the same e-learning platform if they needed it.

The activities of the TFA were devoted to the following subject areas, where more than 300 students (aiming at becoming teachers) were involved:

- Physical Education and Sports;
- Italian Literature, History and Geography;
- Foreign Languages and Cultures;
- Humanities and Geography.

The instrument adopted for the investigation has been a questionnaire (reported in the Attachment 1), to be submitted to all professors involved in the experience, to collect the following information concerning the way of teaching (i.e. the teaching style) and the use of technology in education:

- Analysis of the didactic experience of university professors and of their dealing with the problems of future teachers. together with the investigation on the possible use of different teaching styles to let students become better teachers;
- Analysis of university professors' idea on the features of e-learning, and especially on its possible customization of teaching and students' learning.

In the planning of the questionnaire the following needs have been considered:

- The presence of an e-learning context for the management of teaching for all the professors in the TFA;
- A correspondence between what the professors aimed to do and what they really did;
- To explore the ways for the introduction of digital equipment and e-learning strategies in the teaching of university professors to support their traditional teaching.

The questionnaire has been made of four sections:

- Section A asks for information on the level of involvement of the respondent in the teaching activity of the TFA (hours assigned for lectures etc.);
- Section B proposes the choice of one or more styles of teaching in the carrying out of didactics, by means of a Likert scale based on five values (0 – 4, i.e. not at all - full agreement);
- Section C aims at reconciling the requirements in section B with the need of the respect of the "time" assigned for teaching and the use of digital tools and e-learning; otherwise stated, in this section the professors' awareness on the connection between digital technology, the contraction of teaching times and the dilatation of teaching environment is investigated;
- At the end of the questionnaire a "free" space has been made, within which the respondents can report their considerations, observations and notes on the choices he/she made and, more generally, on their experience in the TFA.

All professors involved in the TFA, in the University of the authors, were invited to answer to the questions in the questionnaire and the same questionnaire was also proposed to colleagues in other Italian universities, both directly and through the support to the Italian Society for Educational Research (SIRD). It has to be remarked here that no feedback on the questionnaire come from the other Italian universities.

Table 2 reports the number of the professors involved in the TFA, which received the questionnaire for the investigation, with a separation between the pedagogical and the disciplinary areas.

Table 2. Distribution of the professors involved in the survey

Professors' Typology	No. of Professors	Percentage
Pedagogical module	5	9,43
Disciplinary modules	48	90,57
Total	53	100,00

Analysis of Collected Data

Table 3 reports the number of the questionnaires which came back to the authors. As in Table 2, it is reported the separation between pedagogical and disciplinary modules, and it is shown the percentage of respondents on the total number of professors involved.

As it can be easily deduced from the data in Table 3:

1. Professors in the pedagogical module took part in the survey in a considerably larger percentage with respect to the colleagues in the disciplinary modules;
2. Professors in the disciplinary module of Humanities and Geography answered the questionnaire more than the colleagues in the other disciplinary modules.

Table 4 shows the distribution of the answers to question 1 in section B, where a Likert scale with 5 values (from 0 = not at all to 4 = maximum) lets getting to know how much the professors liked different teaching strategies in the management of didactics.

As it can be easily deduced from the data in the table, professors in the pedagogical module make choices slightly different form the professors in the disciplinary modules.

In the first case, all professors have liked (values between 2 and 4), the various items in the question.

Discipline professors' answers lead on the contrary to the following considerations:

- They substantially agree on the first two items in the question, for which they express their appreciation (ranging from 2 and 4);
- There is no uniformity for the negative appreciations in the other items in the question, while there is uniformity in the positive ones (10 to 12 faculty members out of 14, express a positive opinion for at least 4 of the other items).

Table 3. Distribution of the professors who answered the questionnaire

Professors' Typology	No. of Teachers	% in the Category	% on the Total
Pedagogical module	3	60,00	5,66
Disciplinary module 1 (Physical Education and Sports)	2	4,17	3,77
Disciplinary module 2 (Italian Literature, History and Geography)	3	6,25	5,66
Disciplinary module 3 (Foreign Languages and Cultures)	3	6,25	5,66
Disciplinary module 4 (Humanities and Geography)	6	12,5	11,32
Total number of professors in disciplinary modules	14	29,17	26,42
Total	17	-------	32,08

Table 4. Distribution of professors' answers to question 1 in Sect. B

Type of Teaching Activity	Percentage of the Responses Given From									
	Professors in the Pedagogical Module (%)					Professors in the Disciplinary Module (%)				
	0	1	2	3	4	0	1	2	3	4
	Enjoyment Level									
Traditional lectures	--	--	33	33	33	--	--	28	14	56
Use of printed and/or multimedia materials	--	--	--	99	--	--	--	--	28	70
Discussion of the objectives of the teaching	--	--	33	66	--	7	7	14	28	42
Discussion of concrete teaching problems	--	--	33	--	66	14	7	--	28	49
Systematic use of evaluation instruments	--	--	--	66	33	14	28	14	21	21
Case analysis and discussion of real situations	--	--	33	--	66	7	7	14	21	49
Use of problem solving strategies	--	--	--	33	66	7	--	7	49	35
Other (specify):	--	--	--	--	--	1 proposal of excursions 1 proposal of training				

As a consequence of the data reported in Table 4, it can be deduced that, in the case of disciplinary modules, professors tend to use more traditional teaching strategies, by assigning a central role to themselves, more than having a coordination/mediation function in teaching.

In Table 5 the analysis of the answers to question 2 in section B of the questionnaire is reported. Now professors are asked to select the time periods that they would like to use for each of the actions and/or processes shown in the table (the same as in Table 4).

It has to be highlighted here that the difference detected in Table 4, between professors in the pedagogical module and the other professors is still present.

With respect to the data in the Table 4 some differences can now be detected in the pedagogical area. One professor, in fact, assigns less time to the use of printed/multimedia materials, to the discussion of the objectives of teaching and to the discussion of concrete teaching problems. The time proposed for these activities is lower (0-1 hours) than one could expect from what it has been expressed in question 1 in the same section. For this professor, the same consideration can be applied to the case analysis and the use of problem solving strategies, notwithstanding the time assigned to these activities is greater than before (1-2 hours).

On the basis of the other data obtained from the questionnaire two hypotheses have been made to explain what emerged in the pedagogical area:

1. The difference between the appreciation for a given didactic strategy, and the relevance assigned to its use in teaching;

Table 5. Distribution of professors' answers to question 2 in Section B

Type of Teaching Activity	Number of Answers Selected									
	Teachers in the Pedagogical Module (%)					Teachers in the Disciplinary Module (%)				
	0-1	1-2	2-3	3-4	4-5	0-1	1-2	2-3	3-4	4-5
	Enjoyment Level									
Traditional lectures	--	--	33	33	33	--	7	14	21	56
Use of printed and/or multimedia materials	33	--	--	--	66	7	--	7	21	63
Discussion of the objectives of the teaching	33	--	33	--	33	35	14	7	14	28
Discussion of concrete teaching problems	33	--	--	--	66	21	7	14	28	28
Systematic use of evaluation instruments	--	--	33	33	33	28	35	14	21	--
Case analysis and discussion of real situations	--	33	--	--	66	14	7	14	35	28
Use of problem solving strategies	--	33	--	--	66	7	14	14	14	49
Other (specify):	--	--	--	--	--	1 proposal of excursions 1 internship (7 hours) 1 laboratory				

2. The difference in the number of CFUs (i.e. hours of teaching) the professor had for his course with respect to other professors (lower than one CFU with respect to the others).

Professors in the disciplinary modules have basically confirmed the guidelines emerged in Table 4; those who choose lectures and printed and/or multimedia matters for their teaching also assigned the higher amount of hours to the corresponding activity (ranging from 3 to 5 hours), the percentages of these choices vary from 78% to 86%.

At last a comparison between the answers to the second question in section B and those obtained in section A has to be done. More specifically, the number of credits (CFUs) assigned to each professor has to be compared with the number of hours they would have liked for their teaching. To make the comparison correct it has to be remarked that professors in the pedagogical module have their teaching split into two parts: 50% as traditional teaching in the class, 50% as online work by means of the e-learning platform.

Synthetically speaking has emerged that follows:

- For two teachers in the pedagogical module (66.66% of the total) there is coincidence between the total amount of the hours assigned and what they would like, in the remaining case (33.33%) the coincidence is limited to the hours for the lectures (traditional lessons);

- The majority of the professors in the disciplinary modules (11 professors, i.e. 78% of the total) select options leading to a total time very close to that assigned for teaching;
- At last, three professors in the disciplinary modules select options for the teaching strategies to be adopted, which led to a total time approximately 50% of that they were assigned (also if no one among them selected special teaching strategies).

When turning to section C of the questionnaire the first question we meet concerns the personal evaluation of professors' teaching time. More specifically it is asked to express a value for the comparison of the time professors used for teaching with respect to that they were assigned.

In Table 6 the distribution of professors' answers is reported.

The data in the table lead to the following considerations:

1. For teachers in the pedagogical module is confirmed what has emerged from data in Table 5;
2. Only 6 professors in the disciplinary module (42% of the total) confirm a substantial identity between the time assigned and what they planned, the others (35% of the total), specify the need for an amount of hours greater than the assigned. It should be noted that now, for the first time, there are professors (21% of the total) who do not answer to the question.

As regards question 2 in section C of the questionnaire, where is requested to specify whether digital technologies and the online among them, have to be used for teaching in the TFA, the answers given by professors are reported in Table 7.

Data in Table 7 shows that professors in the pedagogical module substantially agree on the use of digital equipment in teaching (i.e., they have to use e-learning for their teaching). The same happens for the majority of the professors in disciplinary modules (57% of the total); on another hand, it has to be remarked that many disciplinary

Table 6. Distribution of professors' answers to question 1 in Section C

Total of the Hours Provided in Table 5 Compared to what was Assigned for Teaching	Professors in the Pedagogical Module (%)	Professors in the Disciplinary Module (%)
Less than that assigned		
The same as the assigned	33	42
1.5 times that assigned		14
Double than the assigned	33	14
Triple than the assigned		7
Greater than any previous value	33	

Table 7. Distribution of professors' answers to question 2 in Sect. C

Are Digital Technologies (Including the Online) Useful for Teaching in the TFA?	Professors in the Pedagogical Module (%)	Professors in the Disciplinary Module (%)
YES	100	57
NO	--	--
MAYBE	--	43

professors (43% of the total), do not succeed in identifying a clear position for the use of digital technologies in their teaching.

To better understand the above answers the data reported in Table 8 must be considered; it contains in fact the answers to question 3 in section C of the questionnaire, where the type of digital resources they would have liked to use is specified (all professors could answer to this question because they choose yes or maybe in question 2).

In Table 8 it is clear the difference between professors in the pedagogical module and those in the disciplinary module.

As regards the answers given by the professors in disciplinary modules it is evident that most part of them like tools and instruments for sharing materials and specific software to be made available to students, otherwise stated they have a vision of technological tools in teaching that can be assimilated of Taylor's metaphors tutor or tool (for at least 10 teachers out of 14 - 71% of them).

The last step in the analysis of the connection between the use of digital equipments and teaching can be found in the answers to question 4 in section C, where the use of the above instruments and tools in the various teaching strategies is investigated.

Table 9 reports the distribution of the answers of the professors where the respondents were allowed to select even more options for each task.

The following remarks, that can be obtained from the analysis of individual questionnaires, are very useful to better understand professors' answers:

Table 8. Distribution of professors' answers to question 3 in Sect. C

What Digital Technologies you Think More Useful for Teaching in the TFA?	Professors in the Pedagogical Module (%)	Professors in the Disciplinary Module (%)
Specific software	33	28
E-learning platform	100	28
Online resources	33	56 (including: dropbox, movies and documentaries)
I do not know	--	--

Table 9. Distribution of teachers' answers to question 4 in Sect. C

Teaching Strategy	Professors in the Pedagogical Module (%)			Professors in the Disciplinary Module (%)		
	Specific Software	E-Learning Plat.	Online Resource	Specific Software	E-Learning Plat.	Online Resource
	Instruments and Tools					
Traditional lectures	66	66	--	28	28	70
Use of printed and/or multimedia materials	66	100	--	21	21	63
Discussion of the objectives of the teaching	33	100	--	7	21	21
Discussion of concrete teaching problems	66	66	33	7	21	28
Systematic use of evaluation instruments	33	100	--	14	21	14
Case analysis and discussion of real situations	33	100	33	21	28	42
Use of problem solving strategies	66	66	33	--	28	21
Other (specify):	--	--	--			

- The majority of professors in pedagogical modules (2 out of 3) choose at least two resources in their answers;
- The majority of disciplinary professors (12 out of 14) only choose one resource for each of the item they select;
- Only 5 out of 14 disciplinary professors (36% of the total), choose at least one resource for each activity;
- Half of disciplinary professors (7 out of 14) do not select any resources;
- In the "discussion of concrete teaching problems" 6 professors do not select any resources;
- In the "systematic use of evaluation instruments", 50% of professors do not select any resources;
- In the "case analysis and discussion of real situations", only 4 professors out of 14 do not select any resources;
- In the "use of problem solving strategies", at last, 50% of the professors select at least one resource.

Main conclusion it can be deduced from the above data is the confirmation of what emerged from Tables 4 and 5, i.e. most part of disciplinary professors also when involved in the use of digital technologies like much the first two teaching strategies: making traditional lectures and using multimedia and/or printed matter (9 out of 14, that is 64% of the total).

The questionnaire ends with questions 5 and 6 in section C, which ask professors to give their opinion on:

- Explanation for the use of digital technologies before they use them;
- Use of e-learning platforms for a period longer than that required for teaching.

The distributions of professors' answers are reported respectively in Tables 10 and 11.

As a conclusion, Tables 10 and 11 seem to confirm what emerged on the use of IT/ICT by professors in disciplinary modules, i.e. Taylor's metaphors of tutor and tool for the use of digital technologies in education.

At last the remarks made by professors at the end of the questionnaire have to be analyzed. Only one disciplinary professor has reported it and has expressed the need for a change in the time assigned to his course: which had to have less hours and to be devoted to topics closer to his research interests.

CONCLUSION AND FUTURE DEVELOPMENTS

Notwithstanding the structure of this survey, which is qualitative, and the limits set by the small number of the respondents, it is possible to obtain interesting information on the behavior and competences of university professors.

By synthesizing the data reported in the above sections:

1. University professors in different modules (i.e. pedagogical and disciplinary) make different choices as regards specific teaching strategies. Pedagogy professors choose to use e-learning for their teaching and generally showed to be able in managing different strategies being helped by digital technologies. Professors in the disciplinary modules, focused more on the carrying out of lectures and on the production/use of materials, having themselves at the centre of teaching management (traditional teaching);

Table 10. Distribution of professors' answers to question 5 in Sect. C

Usefulness of Illustration of Digital Technologies Before Using Them	Professors in the Pedagogical Module (%)	Professors in the Disciplinary Modules (%)
YES	66	56
NO	33	35

Table 11. Distribution of professors' answers to question 6 in Sect. C

Usefulness of Availability of Technology Support Beyond the Time of Lectures	Professors in the Pedagogical Module (%)	Professors in the Disciplinary Module (%)
YES	100	77
NO	--	14

2. The result in the above item needs some amendments for professors in the pedagogical module when the times of teaching are considered (Table 5), due to the little number of hours assigned to some teaching strategies. The choice of small time intervals may in fact arise from a careful planning, but can also be the result of a low level of consideration for the use of the same teaching strategies;
3. The choice of small times for systematic evaluation activities by disciplinary professors generally implies little consideration for the feedback from the students participation and study, which has negative consequences on teaching planning, because it is more difficult to help students in overcoming their difficulties;
4. Some disciplinary professors have relevant difficulties in assigning the right times to the activities they plan in teaching (with respect to those effectively assigned to them);
5. Whether all professors have agreed on the usefulness of digital technologies in teaching, most part of disciplinary professors limit their use to the support to lectures and to the autonomous use by the students (Tutor metaphor by Taylor);
6. To reinforce what has been stated in the previous item it has to be remarked the little interest of most part of disciplinary professors for communication and collaborative resources in e-learning platforms, and their use for the construction of communities of learners.

Given the reference framework for teachers' digital competences by UNESCO, which has many points in common with the framework for digital competences for citizenship by the European Commission (2013), it seems appropriate to extend them to university professors for the improvement of their teaching.

Years of studies, experiments and funded projects have shown in fact that teachers in all levels of school can benefit of an appropriate initial training and of continuous updating activities enabling them to acquire digital knowledge, skills and competences for the improvement of their teaching. The same can be done with university professors for the improvement of university teaching and of students' performances.

Main aspect to focus on when planning updating activities for university professors are:

- The expansion of space and contraction of time in virtual learning environments;
- The chance to easily use different teaching styles by means of the IT/ICT (better if with an e-learning platform);
- The chance of monitoring teaching while using an e-learning environment and the opportunity of analyzing students' behaviors at any moment, both individually and in groups.

At last it can be useful to introduce in university teaching elements of Design Based Learning together with an appropriate consideration of the ecology of digital systems and the Internet (Cartelli, 2013). These educational practices are based on problem-based learning and project-based learning with the integration and design of creative process through the diving of teachers and learners in specially designed learning environments. These strategies allow the development of specific

skills of the knowledge society with regard to communication, collaboration and deepen learning.

Note

As regards the authors and their involvement in the paper, Prof. A. Cartelli has worked in the TFA since its introduction, he has planned the investigation, he made the questionnaire and sent it to colleagues in his university and in other universities in Italy. L. De Vito, analyzed the answers, collected the data and made the tables reported in the paper.

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APPENDIX

Dear colleague,

This questionnaire aims at obtaining information on the organization of teaching in the TFA and to identify tools, instruments and strategies that can be useful to the work of the professors involved in this experience.

Among the aims of the organizers there is also a deepen analysis of the individual teaching styles that professors will adopt to let future teachers better plan and develop their educational goals.

The questionnaire is made of four sections:

- In the first section, the personal data of the respondents are collected;
- The second section aims at describing how the respondents will plan the teaching they are charged with, with a special attention to the strategies they will use with no constraint or limitation;
- The third section asks the respondents to compare their expectations with reality data and the possible use of any digital tool or of the e-learning strategies;
- The fourth section lets the respondent propose their remarks.

Answering to the questionnaire does not require more than five to ten minutes and you are asked to give answers as complete as possible.

The participation in the investigation can be made in several ways, by sending the compiled questionnaire (MS-Word file) via e-mail, by printing this document, compiling it and sending it back via internal mail, or alternatively, by coming into the laboratory of the author and filling in the paper version of the questionnaire which is already available.

The personal data that the respondents will provide will not be made publicly available and they will be only used to describe the statistical tendency of the didactic experience in the TFA.

Section A – Personal Data

First name _____
Last name _____
Discipline (scientific field)
_____

Call for Articles

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MISSION

The mission of the **International Journal of Digital Literacy and Digital Competence (IJDLDC)** is to provide a platform for experts, scholars, stakeholders, and other professionals involved in the use of information communication technologies in education and society to share theories, studies, experiences, projects, instruments, and applications. The journal covers ideas concerning digital literacy and digital competence that penetrate the whole society and create shared and commonly accepted educational paradigms to be used in academics by means of a practice-theory-practice paradigmatic approach to education. The journal publishes innovative findings from leading experts, including engineers, researchers, scientists, educators, and practitioners in the creation of hardware-software instruments in everyday education, training, and school work, but also focuses on the methods and processes for the integration of digital technological equipments in the same contexts.

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